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microcomputers

September/October 1984

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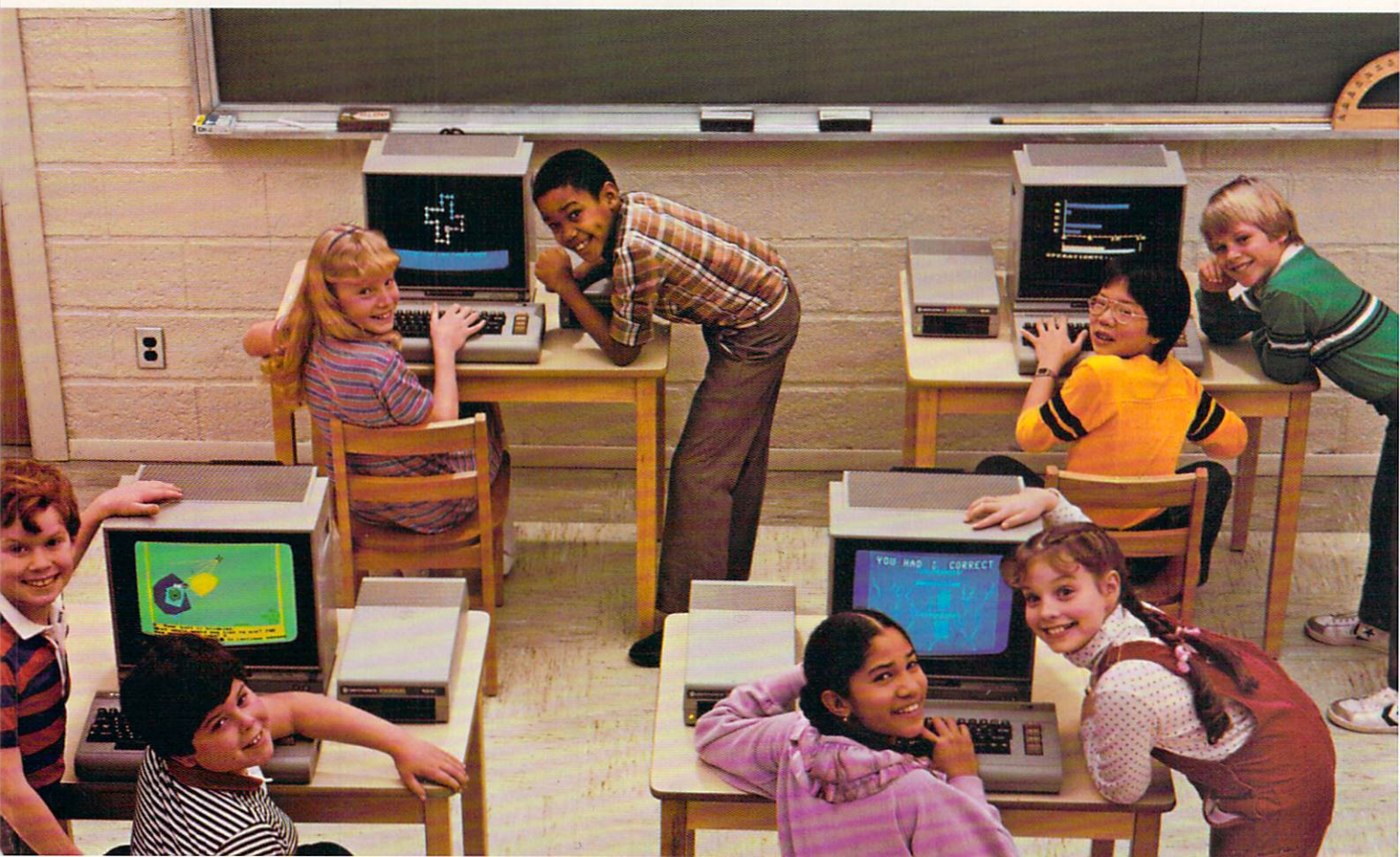
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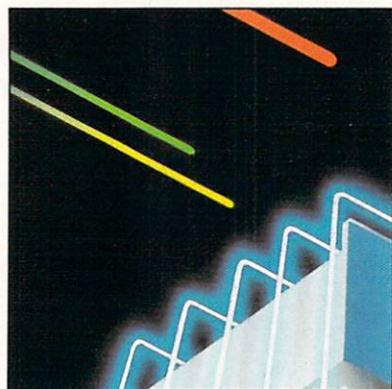
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COMPUTERS

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Watch for These Upcoming Issues

Power/Play, Issue 11 (October/November): Kids using Commodore computers — you know they're out there, but do you really know what they're up to? In this issue we focus on the best of the Commodore Kids, whether they're running kids' computer groups, writing programs, publishing articles or winning science fairs. And, as a special added attraction, you'll love our exclusive interview with kids-and-computers expert Fred D'Ignazio!

Commodore Microcomputers, Issue 32 (November/December): MUSIC! Need we say more? Get an indepth look at the wonders of the Commodore 64's Sound Interface Device (SID)—who's using it to do what, and how you can use it to get the most out of the 64's very special synthesizer. Featuring detailed coverage of electronic composer Ryo Kawasaki and the music he's making with his 64.

Key to Entering Program Listings

"[F1,F2,F3,F4,F5,F6,F7,F8]": F1,F2,F3,F4,
F5,F6, F7 AND F8
"[POUND]": ENGLISH POUND
"[PI]" PI SYMBOL
"^": UP ARROW
"[HOME]": UNSHIFTED CLR/HOME
"[CLEAR]": SHIFTED CLR/HOME
"[RVS]": REVERSE ON
"[RVOFF]": REVERSE OFF
"[BLACK,WHITE,RED,CYAN,MAGENTA,GREEN,BLUE,
YELLOW]" THE 8 CTRL KEY COLORS
"[ORANGE,BROWN,L. RED,GRAY 1,GRAY 2,L.
GREEN,L. BLUE,GRAY 3]": THE 8
COMMODORE KEY COLORS (ONLY ON THE 64)
GRAPHIC SYMBOLS WILL BE REPRESENTED AS
EITHER THE LETTERS SHFT (SHIFT KEY) AND
A KEY: "[SHFT Q,SHFT K,SHFT V,SHFT T,
SHFT L]"
OR THE LETTERS CMDR (COMMODORE KEY) AND
A KEY: "[CMDR Q,CMDR H,CMDR S,CMDR N,
CMDR O]"
IF A SYMBOL IS REPEATED, THE NUMBER OF
REPLICATIONS WILL BE DIRECTLY AFTER THE
KEY AND BEFORE THE COMMA: "[SPACE3,
SHFT S4,CMDR M2]"

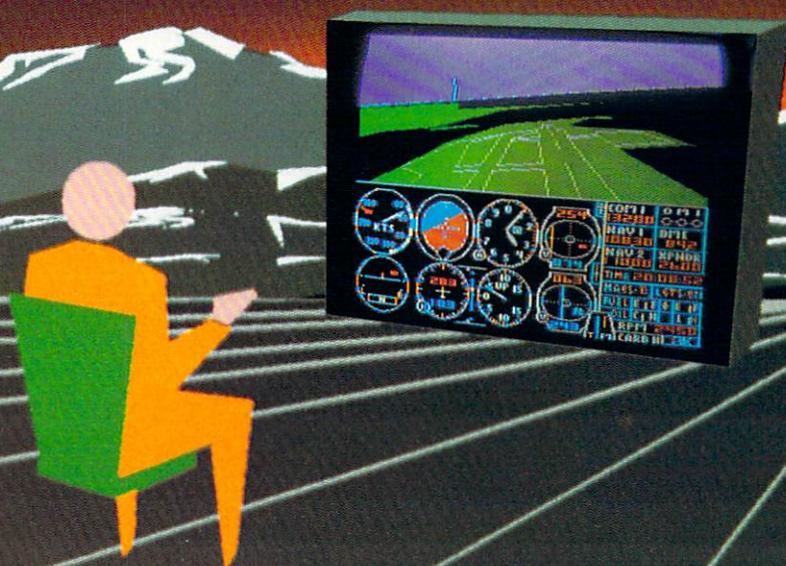
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Public-Key Cryptography Update

To the Editor:

This is an update on "Public-Key Cryptography..." (Issue 26). Readers who have had trouble adapting the drive program to newer model Commodore computers (including the VIC and 64) and who have been getting unwanted TAPE READ ERROR messages should try the following changes:

255...GOTO 367

290...THEN 367

367 B\$=CR\$:GOSUB 530

This inserts a dummy carriage re-

turn at the end of every file and allows a later cassette read of the file to work properly. The program can be modified to work without changing the file format, but it's a little messier.

The problem stems from a change in the way the operating system handles the status variable. Nowadays, ST is set to 64 when GET# fetches the last character of a file. On the original PET, ST was not set to 64 until GET# tried to read character past the end of the file.

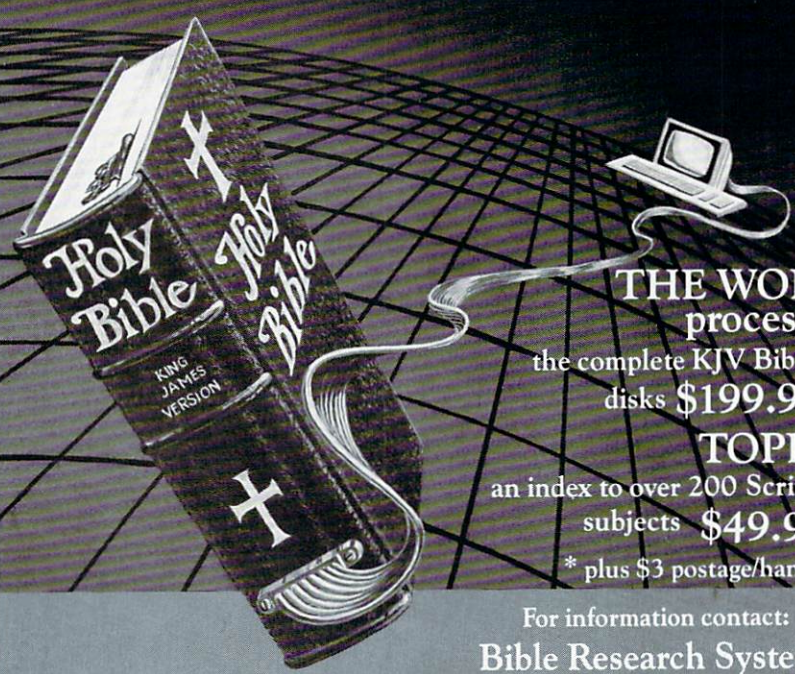
Readers might also check out the Science section of the Febru-

ary 13, 1984, issue of *Time* magazine (page 47). It reports that mathematicians using a CRAY computer and a new algorithm have recently succeeded in factoring a 69-digit number ($2^{251}-1$).

While advances in technology and discoveries of better ways to factor may seem to threaten the security of the RSA cryptosystem, the system does have a builtin safeguard. If necessary, it is relatively easy to use larger numbers as keys. The cost of this is longer encoding/decoding times, which increase roughly as the cube of the keylength. The gain is in increased difficulty of factoring (breaking) the keys, which grows worse in an exponential-like function of the key length. This is a cost/benefit battle that the RSA system is destined to win.

Craig R. Hessel
Green Bay, Wisconsin

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VIC 20's Interfaced with Million Dollar Hospital System

To the Editor:

I am enclosing some pictures that we took at Emory University Hospital's cardiac cath lab. The computer system we are using to analyze the x-ray system's operation is a Commodore VIC 20.

With all the computers on the market today that we could have used, we found the VIC system to be most useful. Some engineers are a little surprised at what we have interfaced with a million dollar piece of equipment, but I believe the Commodore computers are worth their weight in gold.

I would also like to say we have had great support from the local Commodore store, A&S Software, in Atlanta.

In the future we plan to interface more Commodore computers with our cath labs. And we are looking forward to seeing the new products in the future.

William C. Latimer
President, Latco, Inc.
Kennesaw, Georgia

Copying Magazine Program Listings

To the Editor:

As president of the Canton, Akron, Massillon (C/A/M) area users group in Ohio, I would like clarification regarding the typing and copying of programs in your magazine.

Most of our members subscribe to or purchase your magazine each month. We all recognize the publication as a fine piece of computer journalism and receive valuable information from each issue.

At our last meeting we discovered that the same program was being typed by several members. Therein lies our problem. We would like to have members volunteer to type all of the printed monthly programs on a rotational basis and save them to disk. At the following meeting we would



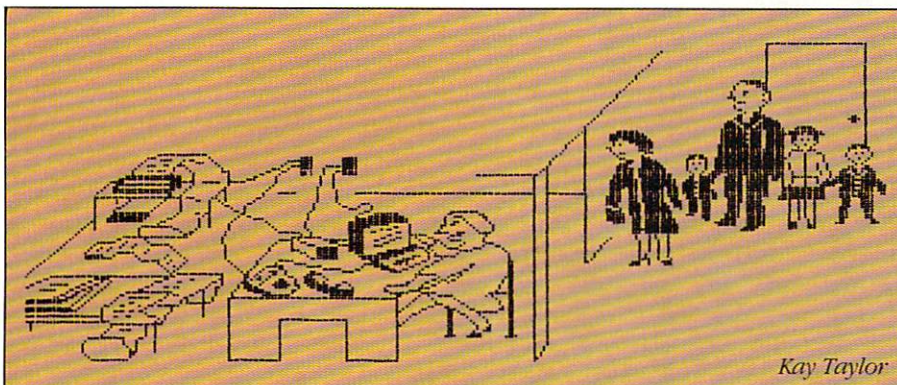
A VIC 20 analyzes the x-ray system's operation at Emory University Hospital in Georgia.

copy all of the programs to each member's personal disk without charge. In this way, all members will have the opportunity to type from their magazine issue and contribute equally to the users group.

I felt it necessary to ask your permission to make copies for members of the users group. Although no charge will be made, we recognize that your magazine is copyrighted so we do not want to infringe upon your rights in this application.

Loren S. Hines
President, CAM Area
User's Group
North Canton, Ohio

We've been asked this question quite a lot lately, so we thought it was time to publish an official answer. Since the entire contents of both our magazines is copyrighted, you may not legally copy any part — neither text nor program listings — for distribution, free or otherwise. HOWEVER, there is one exception — and here's where some of you get to heave a sigh of relief. If you type a program from one of our magazines onto disk or tape, you MAY legally distribute copies of that program to people who own a copy of the particular issue in which that program appeared. But only to those people. Such is copyright law.



Kay Taylor

Mother..... what do you mean you can't go to the movies with us because your new modem microchip has just bypassed the Telex mainframe and you're online with the White House!

**Using your
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application
TODAY
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Diane LeBold, Editor
Commodore User Publications
1200 Wilson Drive
West Chester, PA 19380

Commodore Shines at CES

New Computer Announced

By the time you read this the June Consumer Electronics Show (CES) in Chicago will be long over and the national and local newspeople will have moved on to other stories. We who produce computer magazines, however, will be talking about CES, directly or indirectly, for months to come. For instance, many of the products we'll be reviewing from now until the next CES in January (and probably even after that) are those that were shown for the first time at that June show.

Commodore products—both hardware and software—were, as usual, among the big hits of the show. Most notable among the Commodore products is an entry-level version of the Plus/4 series computers (originally called the 264 series). Called the Commodore 16, the new computer looks a lot like a Commodore 64 from the outside, but the internal workin's are a shaved down Plus/4, with 3.5 extended BASIC, builtin machine language monitor, 16 colors with eight luminence levels, 40-column screen with 320 × 200-pixel resolution, compatibility with the 1541 disk drive and 1531 datassette, and upward software compatibility with the Plus/4—all for what promises to be a ridiculously low price.

Although the exteriors of the Plus/4 and the Commodore 16 are different, the only significant difference between their interiors is the amount of RAM—the 16 has 16K and the Plus/4 has 64K—and the fact that the Plus/4 has builtin software. Look for an indepth review of the Commodore 16 in an upcoming issue. It should be a hot item in the second half of 1984.

Commodore also showed their new *Videotex 64* telecommunications package, which allows you to combine high-resolution graphics with text and transmit the whole thing via modem using the Commodore 64. The new package uses NAPLYPS protocols—the latest in telecommunications technology—and is simple to use, with just a few menu screens and online help. You can be sure we'll be covering this advanced product in depth in an upcoming issue as well.

In addition, Commodore announced a new contract with Adventure International to produce and distribute six adventure games featuring Marvel Comics characters, including the Hulk™ and Spiderman™. The new series, to be produced for the Commodore 64 and Plus/4 computers, is called *Questprobe*. To make things even more interesting for all our comic book fans, Marvel will also be publishing comic books that coordinate with the games.

Of course, as time goes on we'll be continually writing about the many other Commodore-related products from both Commodore and independent manufacturers that were announced in June. After all, that's our job. So stay tuned. We've got a lot of information just waiting to get into print.

Finally, you may have noticed the absence of Neil Harris' name in our masthead. After over a year and a half as our director of publishing, Neil is now serving Commodore in our software division. Neil was instrumental in helping upgrade our magazine's overall quality and in helping engineer the department's growth. Those of you who enjoy his writing, however, will be glad to know he's promised to contribute regularly to both our magazines.

We think you'll like our feature section this month, showcasing productivity software for Commodore computers. Especially helpful, I think, is the chart listing just about every piece of productivity software for our computers presently known to be in existence. Our thanks to The International Software Database Corporation in Fort Collins, Colorado, for supplying that list.

—Diane LeBold
Editor



Diane LeBold

Commodore 64 Magic Desk I

Only From Commodore—The Excitement and Simplicity of Magic Desk!



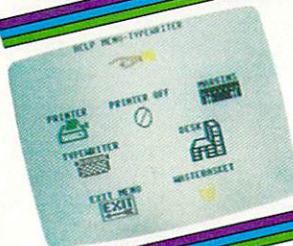
Only Commodore brings you the magic of MAGIC DESK... the next generation of "user friendly" software! Imagine using your computer to type, file and edit personal letters and papers *without learning any special commands!* All MAGIC DESK commands are PICTURES. Just move the animated hand to the picture of the feature you want to use (like the TYPEWRITER) and you're ready to go.



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To PRINT a page you've typed, just "point" at the picture of the printer and your pages are automatically printed on your COMMODORE PRINTER or PRINTER/PLOTTER. If you want to erase what you've typed, the WASTE-BASKET under the desk lets you "throw away" pages. There's even a DIGITAL CLOCK which helps you keep track of time while you're typing.



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Another reason why Commodore is number one in the world of microcomputers—Come join us.

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Explosive Software Growth Predicted

The U.S. microcomputer software market is expected to grow from \$1.85 billion in 1983 to approximately \$12 billion (1983 dollars) in 1990, says a new 100-page report by FIND/SVP, a New York-based information and research firm. The key to this explosive growth is evolving distribution strategies in business, education and home markets. The report, *Microcomputer Software Distribution*, forecasts a shakeout in the general application business and home markets, while software publishers and distributors who do not gain a share in these markets will compete for the smaller special applications market.

"The next two years will see a continuation of the rapid evolution of the microcomputer industry," says Peter Allen, FIND/SVP manager of market reports. "The manner in which microcomputer software is distributed will be one area in which the changes will be most conspicuous."

The FIND/SVP report focuses specifically on evolving distribution patterns and strategies from microcomputer software. It defines "microcomputer" as a complete system with a top retail price of \$10,000 and separates software to operate such systems into two groups: general business applications, such as word processing or spreadsheets, and industry specific programs made for applications unique to a certain vertical market.

The two predominant channels of distribution for software are retail outlets and direct response. Between them, they account for some 78% of all microcomputer software dis-

tributed in 1983. However, the study projects a decline in the importance of these two channels due to: changing user sophistication and numbers, enhanced technology, a shakeout in the personal computer hardware industry and advanced marketing programs. These factors will create a new environment for distribution of microcomputer software in the second half of the 1980's.

The years 1982-1983 saw a critical change in the microcomputer industry. During that period, the installed base of personal computers rose dramatically. Suddenly there were thousands of new users. This surge in use generated two distinct user groups: those who used computers before the surge and are now the leading-edge buyers and those who are new to computers and who require foolproof or user-friendly programs.

For software publishers, these emerging groups represent different strategic challenges in the formulation of distribution patterns. The leading-edge users have, in many cases, become the key microcomputer decision makers in their organizations. As such, they influence large purchase decisions. This group's sophistication often requires enhanced software and in-depth sales techniques. To win over reluctant new users, publishers must also provide onscreen help tools, elementary documentation and tutorial materials.

At the same time, changes in distribution patterns for microcomputer software will result from technical innovation. Among the major developments that publishers will

need to consider are the implementation of integrated software and operation environments as a standard part of microcomputers; the maturing of electronic distribution as a viable distribution channel; automated disk production; and mainframe/microcomputer interaction and networking as regular aspects of the automated office.

The advent of professional marketers in the software industry will have a major impact on software distribution channels. Large increases in advertising budgets and a heightened search for the perfect image will put enormous financial pressure on software publishers. Increased advertising will also fundamentally alter the means of competing for both software and hardware producers.

Franchise stores, both computer and software-only varieties, should prove to be the premier channel for the remainder of the decade. Software-only stores will use volume purchasing to offer the best prices and widest choice, while computer stores will capitalize on their ability to sell software as part of a package to first-time users. Independent retail stores will need to stress support training, overall personal attention to customer needs and their special knowledge of industry-specific requirements.

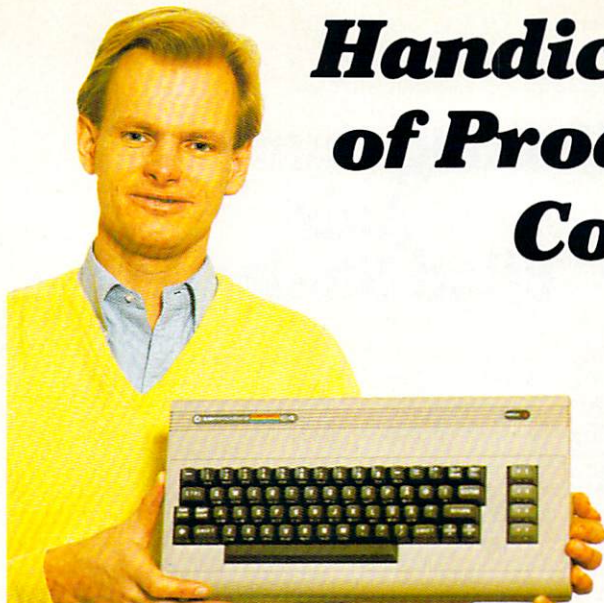
Other retail outlets will continue to distribute software, though their impact on the market may decline. Office equipment dealers will prove only marginally useful in software distribution, as they are not well positioned to offer a broad choice or competitive pricing. Both fullprice and

offprice mass merchandisers will continue to offer software, but in a limited fashion designed to sell customers who are in the stores for other reasons. Discount electronic stores will also generate only marginal sales, as they discover the difficulty of matching software-only store pricing structures.

FIND/SVP's study goes on to pinpoint the key issues to consider for competition in the microcomputer software market. The more successful competitors will be the ones who can establish brand identity beyond any single product they may offer; who can develop the financial arrangements, customer relations and cooperative advertising functions critical to product support and training programs; and who can accommodate the profit margin squeeze brought on by declining software prices and consumer comparison shopping.

A few leading software publishing companies will come to dominate the general applications markets. Small publishers will concentrate on vertical markets. To access such markets, these publishers will turn to cooperative ventures with other types of companies, for example, value-added remarketers or computer service companies. The growing sophistication of the user base will require all publishers to strengthen brand image.

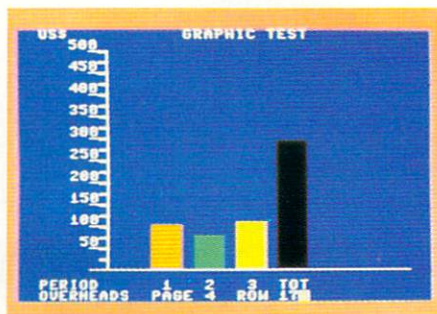
The FIND/SVP report was published in March of 1984 and is available from Information Products Division and can be ordered from FIND/SVP, 500 Fifth Avenue, New York, NY 10110. The telephone number is 212-354-2424.



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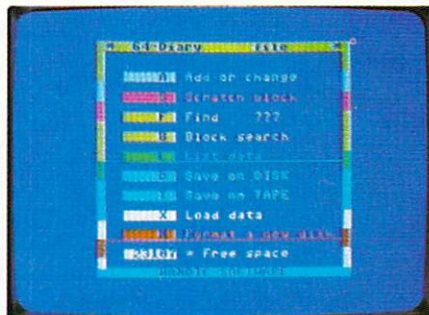
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SALES	300	300
SALES	150	150
TOTAL	450	450
SALARIES	100	100
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UTILITIES	250	250
CONTR	245	245
OVERHEAD	240	240
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PROFIT	NA	NA

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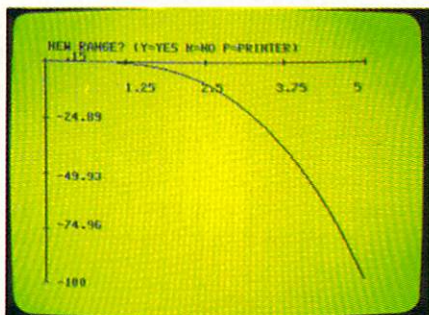
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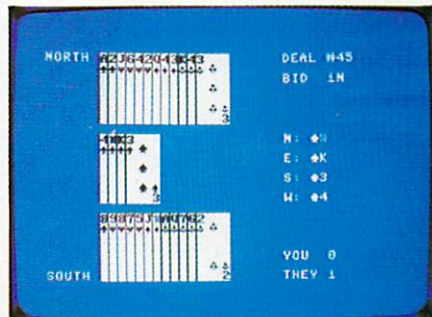
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Afraid of power failure? A blackout or a power surge can wipe out your program and hours of your work. Creative Electronics of Thousand Oaks, California, has an answer with a low priced battery backup system. The unit plugs in between your computer and power supply. It recharges continually and when power fails, it automatically activates and supplies about one to three hours of reserve power. It also supplies power to the

cassette for saving your programs or data.

It is very easy to install and its compact size permits either desktop use or out-of-the-way use. The battery backup does not put a strain on your computer's power supply and it shuts off automatically when you power down. The unit has a large 12-volt 5-amp per hour battery. Its being charged by standby trickle charge allows longer battery life.

Circle Reader Service No. 500

Talking Computer Aids Blind Students

Talking computers were once the staple of bad science fiction films, but a professor at Hobart and William Smith Colleges in Geneva, New York, has found a practical use for a computer terminal that says what's on its screen.

"It's useful for students who have a vision impairment or are blind," says Irving O. Bentsen, professor of mathematics, who obtained the talking terminal for use in the colleges' mathematics and computer sciences department two years ago. Bentsen himself is blind.

Unlike its fictional counterparts, Bentsen's terminal doesn't hear and does not carry on conversations in the typical sense. The instrument, known as "Total Talk," is a Hewlett-Packard terminal, linked to a PDP 11/44 minicomputer located in another campus building. Maryland Computer Services installed the voice processor in a module beneath the monitor screen.

The voice unit has controls for volume, pitch, tone and speed and a jack for headphone use. Pitch varies as the machine speaks a sentence and indicates punctuation by dropping on the last word of a statement or rising on the last word of a question.

"A person not used to listening to the terminal's speech may find it difficult to understand at first," Bentsen says. "It can be difficult understanding complicated mathematical expressions, but usually I find the speech easy to follow."

The voice reads the words on the terminal's screen as they are followed by the cursor. It can be adjusted to read continuously or to stop at each line, word or—when the voice cannot handle the nuances of a word such as a "rendezvous"—to spell each word

letter by letter.

"One remarkable thing about the machine," Bentsen says, "is that it has an unlimited vocabulary. For example, it puts phonemes (speech sounds) together according to a set of about 400 rules of pronunciation. Where these rules fail to yield an accurate pronunciation of a specific word, the user can program in the correct pronunciation."

The professor uses his talking terminal in much the same way a sighted person would utilize a computer. He keeps his departmental files, grading schedule and mathematics notes in the system and uses it to investigate mathematical theories when computations would take too much time if done by hand.

By using a printer, Bentsen can produce letters or written assignments for his students.

There are a few disadvantages, he says. "Although the terminal can utilize a considerable portion of the host computer's editing capabilities, some more sophisticated editing features available on other terminals compatible with the PDP 11/44 are not available."

Also, the voice unit slows the machine.

"When you use it with the voice, information is fed into a buffer, then transmitted through the speech synthesizer," he explains. "The signal comes through slower than the 2,400 baud (bits per second) speed of which the machine is normally capable."

Another drawback of the customized terminal is its price. A typical computer can cost about \$1000, but the unit needed by Bentsen and other visually impaired users costs \$5,000. It was purchased with funds designated to assist the handicapped at Hobart and William Smith.

New Books for the 64

Datamost, Inc., a publisher of software and computer-related books based in Chatsworth, California, announced the release of six new Commodore 64 book titles.

Commodore 64 Game Construction Tool Kit teaches how to write BASIC games. The book gives examples of different games and teaches fundamental lessons of quality game programming. Game tools, techniques, graphics, sound and sprites are all discussed.

Commodore 64 LOGO Workbook introduces the LOGO programming language to children in grades two through six. Lessons are structured in a workbook format and include what a turtle is, how to use visual problem solving, variables, geometry and recursion. Written so children can easily understand, the *Workbook* teaches LOGO in a simple format.

Guide to Commodore 64 Software and Hardware is the first detailed listing of products available for the popular Commodore 64. Each product is listed by category, accompanied by a brief description, manufacturer information, price, medium and any special system requirements. Over 1500 products, representing

300 companies, are listed.

Inside Commodore DOS is for any programmer who wants to know more about the Commodore 1541's DOS, complementing the Commodore 1541 user's manual. The book includes complete information on formatting, storage, backing up protected disks and recovering damaged data.

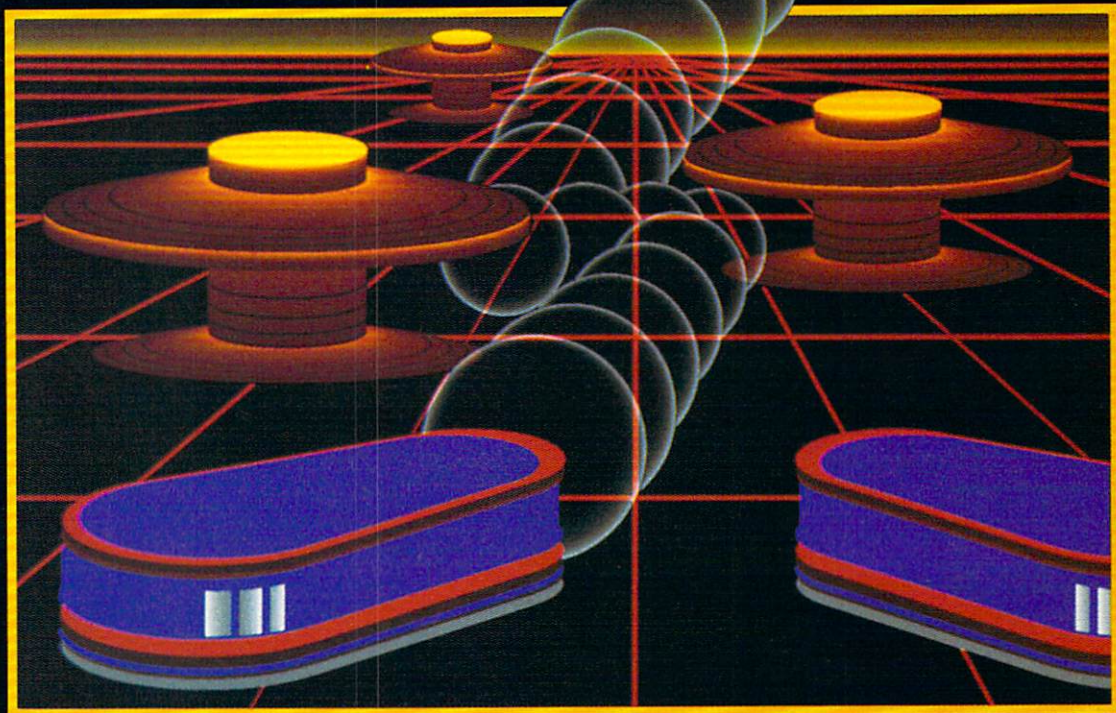
The *Super Computer Snooper* shows how the 64 "thinks". The book investigates memory, screen, programs, variables, keyboards, printers and peripherals. You'll trace the path of a character from the first keystroke to the final printout, restore erased files, identify hidden files and write a program which rewrites itself. For the BASIC programmer who wants to prepare for machine language.

Wiz Explores Your Commodore 64 is an interactive picture book, activity workbook and disk that teaches young children how a computer works. *Wiz* takes the child on a guided tour of the Commodore 64, explaining terms like CPU, RAM, ROM and bytes in simple terms. The activity disk is tailored so children can progress at their own speed.

Circle Reader Service No. 501

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New Million-Bit RAM Chip

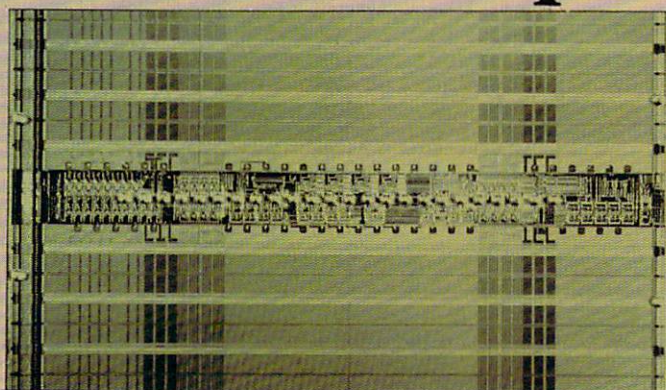
An experimental computer memory chip that can store more than one million bits of information has been fabricated on an existing manufacturing line.

The experimental chip, called a one megabit dynamic random access memory (DRAM), was fabricated on the same manufacturing line the company has used since 1978 for mass production of other high-density memory chips, including those that store 64,000 and 72,000 bits of data.

Use of these existing manufacturing facilities has both demonstrated the chip's manufacturability and accelerated its development for potential use.

Engineers have demonstrated that the fabrication process has already been developed far enough to produce perfect chips. Individual chips have been made in which every one of the 1,048,576 memory cells is free of defects and in which it is possible to write data into and read data out of each cell.

The megabit chip, developed at IBM's laboratory in Essex Junction, Vermont, was made using an extension of IBM's Silicon and Aluminum Metal Oxide Semiconductor (SAMOS) processing technology,



IBM's one megabit DRAM chip can store the equivalent of one hundred pages of text.

ogy, which the company has been using since 1978.

The chip operates with a single voltage, five-volt power supply. The one million-plus memory cells and their support circuitry occupy an 80.85 square millimeter area of silicon. The chip dimensions are 10.5 mm by 7.7 mm (about $\frac{3}{8}$ inch by $\frac{5}{16}$ inch). The time needed to read data out of the chip is 150 nanoseconds (billionths of a second).

A million-bit chip has the capacity to store approximately one hundred pages of double spaced typewritten text. A paperback novel of about 250 pages could be stored in just six of these chips.

A number of improvements

in photolithography and processing technology contributed to the development of the one megabit chip. For example, enhancements to conventional optical lithography and photoresist formulation made it possible to fabricate circuit elements on the chip as narrow as one micrometer—about 1/50 the width of a human hair.

Extending the capability of photolithography is of fundamental importance since, in general, halving the width of the lines of a circuit pattern makes it possible to fabricate the same pattern in only one quarter the area.

The high storage density (13,025 bits per square milli-

meter) of the new chip is also derived in part from the use of advanced processing technology. A new processing step that electrically insulates adjacent storage nodes from one another allows them to be placed less than one micrometer apart without creating unwanted electrical effects that would tend to impair chip performance.

Another processing development that directly contributes to the density of the one megabit chip is the use of an extremely thin layer of a composite dielectric material to cover the storage nodes. This layer is only 15 nanometers thick or about 50 to 60 atoms high.

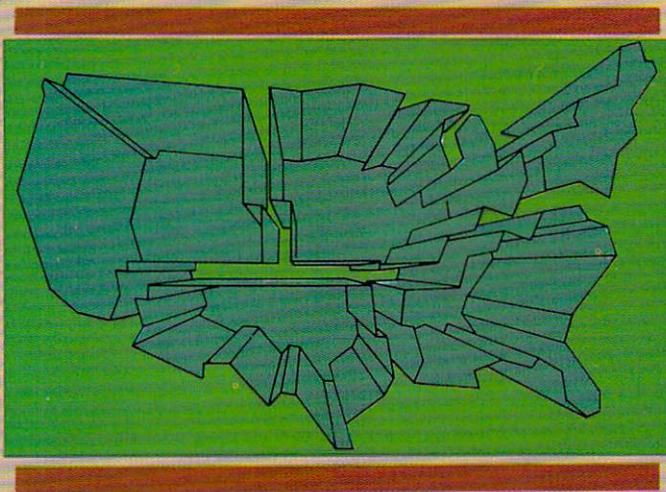
Reducing the thickness of this layer makes it possible to increase the amount of electrical charge that can be stored without increasing the area of the node which takes up a sizable fraction of the memory cell itself. In this way, a strong and easily sensed signal can be obtained from the cell without the need to enlarge its area.

The chip is packaged on a 22-pin ceramic substrate 12 millimeters square (about $\frac{1}{2}$ inch on a side) using IBM's flip-chip bonding technology. This makes possible a packaging density of four megabits per square inch.

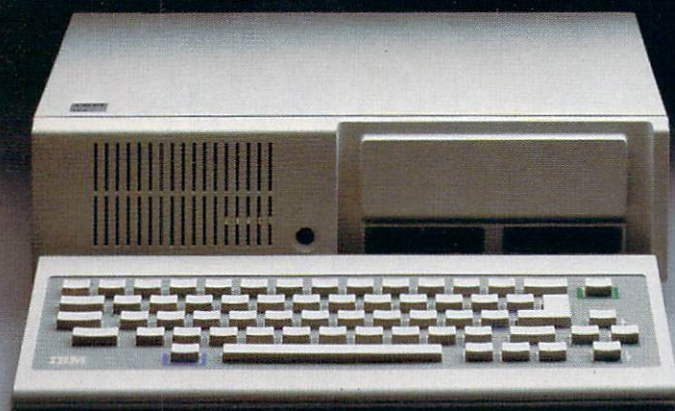
National Street Map on Computer

While the scenario of putting a map of the entire United States into a computer may sound a little far-fetched, a company from Lyme, New Hampshire has encoded into a mainframe computer information about every street in the United States.

The company, Geographic Data Technology, uses a Summagraphics D-Series digitizer and street maps to capture some 300 bits of geographic data such as street names, address range, latitude/longitude coordinates at each intersection and zip code boundaries.



While Geographic Data Technology works to complete the task, it breaks off bits of its huge database and sells them to whomever can use them. They have sold latitude/longitude coordinates to a cookie manufacturer to help them quickly load and route their trucks from the factory to their retail outlets, census tract coordinates to site location executives to help them choose where to put a new car dealership, zip code boundaries to target newspaper readership and minor civil division boundaries to map acid rain measurements.



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Award-Winning Educational Software

Sunburst Communications Inc. has carried away seven awards, the largest number received by any publisher, in the 1984 Software Search of the Council for Exceptional Children (CEC), according to Marge Kosel, vice president of the educational publisher's micro-computer courseware division.

Fifty-five commercial companies and 49 individual developers submitted entries for CEC's first annual software search. The purpose of the search, according to Josephine Barresi, CEC's director of special projects, was "to establish standards of excellence for educational computer software and to increase the availability of computer programs designed to be effective in the education of handicapped and gifted children."

There were ten divisions within the competition, which was organized by CEC's Department of Professional Development with the support of the Johns Hopkins University

and John F. Kennedy Institute. Each division within the search appointed judges throughout the country to test the software for technical excellence and educational relevance and merit.

CEC is a membership organization that provides information to teachers, administrators and legislators concerned with the education of the handicapped and gifted children. It maintains a library of professional literature in the field of special education and coordinates a political action network supporting the rights of exceptional persons.

Sunburst, a New York-based education publisher since 1972, began its micro-computer courseware division in 1981 and has developed a line of over 60 programs for most major microcomputers. Specializing in the area of problem solving, the company also develops programs in the areas of early elementary, mathematics, language arts and computer literacy.

Talking Software for the 64

EnTech Software of Studio City, California, has introduced software that talks in a real human voice. It allows the Commodore 64 to reproduce the intonations, accents and character of real speech.

EnTech will be using this new speech process to enhance all of its current software. Talking versions of its popular *Space Math 64* educational game, music program *Studio 64* and business program *Management System*

64 were introduced at the Summer Consumer Electronics Show in Chicago. EnTech will also be producing a new line of talking educational programs.

According to EnTech's chairman Ray Soular, "Our innovation makes the computer more human. By talking in a human voice, the home computer will be able to teach foreign languages, help with spelling, tell stories and do many things it couldn't do before."

Circle Reader Service No. 508

Software Publisher Offers Kids' Programming Seminars

Micro Lab, a midwestern software publisher, has opened its doors to top computer students from Chicago's public schools, offering expertise from Micro Lab's own programmers to students with the potential to become programmers in the industry.

"Offering such a class," said Micro Lab president Stanley Goldberg, "is an opportunity for us to give back to the community what we have earned."

Goldberg, an advocate of computer education, urges software industry leaders to take responsibility for setting computer literacy standards and for helping schools to meet them. "Children without computer training face a future as bleak as that of children who cannot read or write," Goldberg commented.

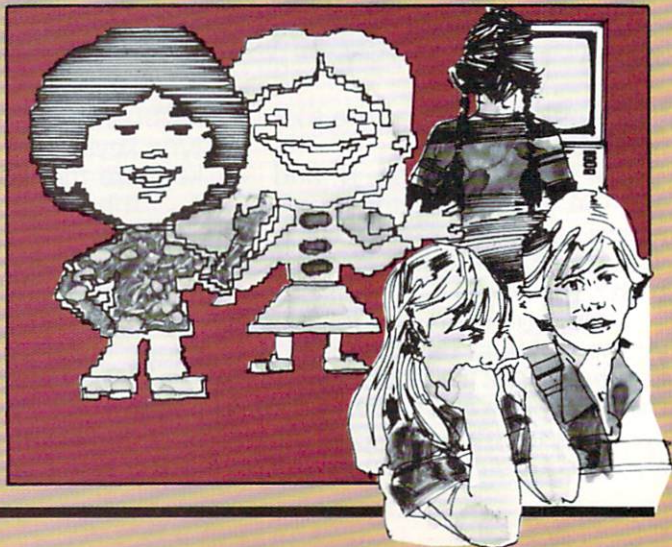
The pilot program, the Micro Lab founder explained, is intended as a model for educational services other computer industry firms might offer.

At the invitation of Goldberg

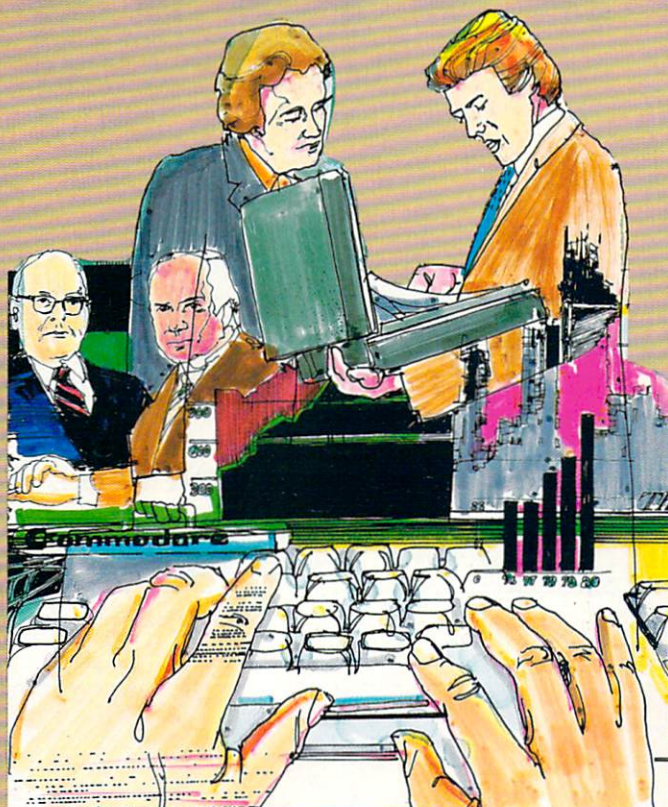
and Micro Lab employees, the Chicago Public Schools Bureau of Computer Education selected 15 teen students from many applicants attending computer education courses at Chicago high schools.

At the Highland Park company headquarters, a bus carrying students from a dozen Chicago neighborhoods discharges students into the care of Micro Lab programmer Curt Rostenbach who serves as seminar instructor.

"Each student comes from a different computer experience," said Rostenbach. "Some have extensive familiarity with large computers while others have also tinkered with microcomputer programs on their own," he said. "But before they leave Micro Lab, they will know as much as I can teach them about assembly language. In high school I would have given anything to have access to the information I'm trying to give them," Rostenbach explained.



First Computerized Funds Transfer Banking System



Free Software Upgrade

Timeworks' *Data Manager* owners who wish to upgrade to Timeworks' *Data Manager 2* database program may now take advantage of Timeworks' new trade-up policy and exchange their *Data Manager* program free of charge for any other Timeworks program in the same retail price category when they purchase Timeworks' *Data Manager 2*.

The *Data Manager 2* has many advanced features including sorting alphabetically, numerically or by date, along with expanded graphic capabilities. A new type of data storage system has been created to improve and facilitate information storage and retrieval. *Data Manager 2* will fill the needs of both the home and small business user.

It will be the ongoing policy of Timeworks to offer this type of program to software customers whenever an enhanced version of any current Timeworks program is announced. Timeworks, located at 405 Lake Cook Rd., Bldg. A, Deerfield, IL 60015, markets a broad range of education, home management, computer education, entertainment and business systems for the Commodore 64.

Circle Reader Service No. 509

The Arizona Bank has completed installation of the banking industry's first microcomputer-based electronic funds transfer (EFT) system capable of fully automating wire transfer operations.

According to Robert M. Fink, vice president and project director at the Arizona Bank's operations center, the newly installed WireNet system, developed by BankPro Systems of San Francisco, employs a local area network of IBM Personal Computers to process the bank's 500 daily incoming and outgoing funds transfers. Routed via three major wire services, the transfers represent a daily volume of \$500 million.

"In automating with the WireNet system, we have replaced our manual transfer operations, which entailed constant telephone and paper communications between our wire room and our nearly 100 branch offices," Fink said. "As a result, we have created a secure funds transfer environment in which the chance for error and the opportunity for malfeasance are vastly reduced. At the same time, we have greatly increased employee productivity, eliminating the need for a projected 50 percent increase in our wire room staff over the next three years."

According to Fink, the Arizona Bank selected the WireNet system largely on the basis of its capability to interface with the bank's IBM mainframe host computer, its potential for expansion as the number of wire transfers increased and its provision for a uniform, automated interface to the major domestic wire services—Fedwire, BankWire and Telex/TWX. In the near future, the bank plans also to interface the system with SWIFT, an inter-

national wire service.

"The WireNet system met our specifications at less than half the cost of a minicomputer-based system with comparable capabilities," said Fink. "Because WireNet is modularly designed, it also permitted us to buy only the capabilities that we currently need while providing a means for readily expanding our funds transfer operations in the future."

The WireNet system provides a wide range of features for speeding and simplifying wire transfers and for ensuring their security. Files on each funds-transfer customer and correspondent bank are maintained online for ready reference by authorized personnel. The system also provides operators with a uniform screen template which automatically translates information for each transfer into the appropriate wire service format. In addition, the system maintains detailed security profiles on each operator and workstation and specifies the functions that the operator or terminal may perform, as well as such limitations as the amount of a transaction.

An entry level WireNet system, including two operator workstations with total redundancy, two data servers, access to one wire service and training at BankPro headquarters in San Francisco, is priced at \$85,000. A four workstation system with access to two wire services—a configuration that can meet the funds transfer needs of most institutions—is priced at \$120,000.

BankPro Systems was founded in February, 1983, to design and market sophisticated, low cost computer systems for corporate applications in non-moneycenter banks. C

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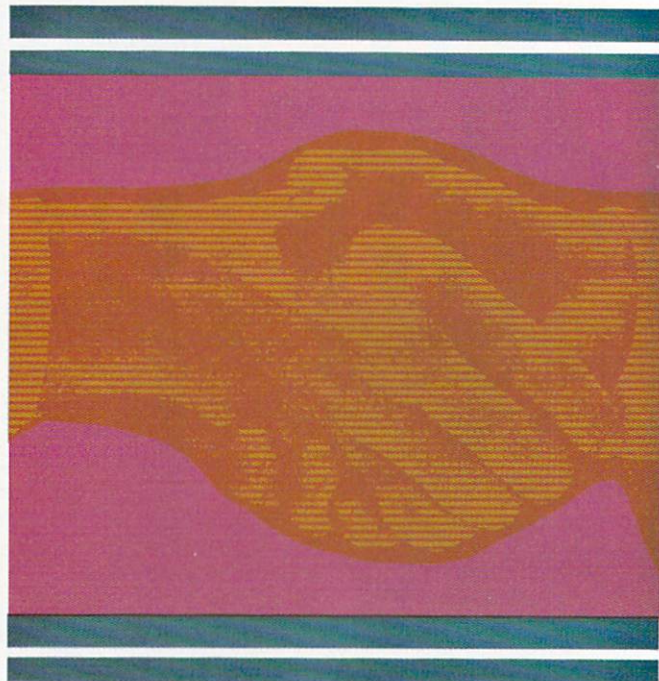
Commodore 64 in Community Service

By W.J. Crowley

Recently while serving a term as mayor of our small city, I became aware of a problem that had plagued mayors and city officials for several years. Mayors, city clerks and councils often need to re-search city ordinances looking for specific provisions, regulations or rulings. City officials are responsible for assuring that there are no conflicting or ineffective ordinances and that those which are in effect can be clearly and fairly enforced. Fulfilling that responsibility usually meant a tedious two or three hour search through 700 or 800 documents to assure the integrity of new ordinances.

Before a new ordinance is adopted or an old one is amended, the suggestion is first introduced to the council as a bill and assigned a unique identifying number. When the bill is passed, it becomes either a new ordinance with a new number or an amendment to the original ordinance. So bill number 666 might become ordinance 555 if it's a new one or number 12.3 if it happens to be the third revision to ordinance number 12. Bill numbers for those that fail to pass are simply skipped, so the bill number never matches the ordinance number.

The usual practice for small cities is to file ordinances in a series of notebooks (nine in our case) in bill-number sequence. This makes it easy to see if any ordinances are skipped, misfiled or otherwise misplaced. However, with this scheme, it's impossible to know if the ordinance you are reading is really the last and most current issue. If you've found ordinance 212.7, how do you know there's not a 212.8 or 212.9 around somewhere? To ease the search, some of the past officials filed amendments behind the original ordinance and some filed them in the normal bill-number order, but put a copy with the original. Of course, these solutions had their problems. If you found a copy of an ordinance in a book, you couldn't be sure it hadn't been superseded — you needed to search for the original anyway, just to make sure you had the latest document. On the other hand, if you did find an ordinance in the expected notebook location, you couldn't be sure an amendment wasn't filed elsewhere.



In another effort, one of the councils had hired a consulting firm at a cost of some \$8000 to "codify" the ordinances. This too resulted in frustration, because the consultant merged and combined previous ordinances, producing a reworded, unfamiliar document. As you might expect, the task was too burdensome. None of the councils, including mine, could understand the new document well enough to certify its accuracy and pass it into law, discarding all the old ordinances.

With this experience, I decided the situation could best be treated as a database management problem. I bought a copy of Commodore's *The Manager* and began organizing the information. From a sample of about 50 ordinances selected at random, I developed a first draft of the classifications shown in Table 1. I used type numbers instead of titles just to simplify typing. *The Manager* translates the numbers to names for me by using an arithmetic file. The keywords within each type were chosen by experience and updated as new ones seemed appropriate. With the samples in hand,

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Table 1. Ordinance Types and Keywords**Type 1. ADMINISTRATIVE***(concerning operations)*

Appointments
 Authorizations
 Bills
 Budget
 Elections
 Insurance
 Procedures
 Salaries
 Taxes
 Transfer of funds

Type 2. FRANCHISE*(granting special privileges)*

Cable TV
 Electricity
 Fireworks
 Garbage collection
 Gas
 Phone

Type 3. PUBLIC IMPROVEMENT*(regarding public works and projects)*

Construction
 Education
 Health and Safety
 Roads and Bridges
 Services
 Sewer
 Water

Type 4. REGULATORY*(describing penalties for improper conduct)*

Animal control
 Authorizations
 Lake control
 Nuisance
 Property
 Traffic
 Trespassing

the screen shown in Table 2 was designed to closely match the format of the ordinances so that it's easy to use. Then I entered the sample data and designed four reports sorted by bill number, ordinance number, type and title.

After a little tuning up on the reports and data, I took my tape recorder to city hall and reading from the ordinance notebook files, dictated a second sample of 50 ordinances. Whether due to urgent need or careful planning, the council reviewed my reports without further suggestions, commenting only on how useful the index would be and asking how soon it could be finished. The remainder of the

work went quite rapidly. I used the tape recorder method to review two notebooks (about 200 documents) on successive Saturday mornings and entered the data on weekday evenings. During this time I printed only "Bill Number" reports, checking them over after a tape was entered so that I could mark up any corrections in the following Saturday's session.

In four or five weeks the job was finished and the council now has an index for researching ordinances rather easily. Of course, I intend to update their database every six months or so, but even if I can't for some reason, the index summarizes twenty-odd years of activity, certainly reducing the research problem to reasonable proportions for many years to come.

As an editorial comment, I might add that I was pleasantly surprised at how well we had all done over the years, keeping our bills and ordinances in logical order. Of course, I found a few instances where bill and ordinance numbers were duplicated, misfiled and one or two that were lost, but we didn't really have the wholesale problem one might fear. Once the index was made, it became quite easy to spot and correct discrepancies, so the project had helped to validate our city records in several ways.

While work on the ordinances progressed, some of our citizens became interested in the project and suggested other community service-oriented ideas. Suggestions included keeping an inventory of the city property assigned to the police, sewer, and water departments and automating the city water billing operations and other mailing list functions. Whether I become "convinced" to take on one or another of these projects or some other interested computerist volunteers, the seed is planted. One project is completed and the community is better off for the presence of personal computers.

Table 2. Sample Screen Format ORDINANCES

```

*****
      BILL #          ORDINANCES #
      [    ]          [    ]

              TITLE
      [                                ]

      TYPE              MM DD YY
      [    ]            [    ]
*****
  
```

C

Kids Learn With *Frenzy/Flip Flop,* *Gulp* and *Arrow Graphics*

Commodore now offers the Milliken EduFun series of educational software for the Commodore 64. These four are among the first to become available.

Frenzy

DIVISION!!! A math skill area which parents, students and teachers approach with equal apprehension is suddenly simple thanks to Commodore's Milliken EduFun game *Frenzy*.

The fear is removed from division as the operation is broken down into its component parts. Kids are given the opportunity to practice both the recall of multiples and repeated subtraction at various levels of difficulty. Incorrect answers are ignored and the program shows the same problem until the correct solution is entered.

Of course, completion of the 20-problem series in either operation (subtraction or division) is rewarded with a determined amount of game playing time. Game time is calculated in seconds during the drill series as a hungry alligator gobbles up fish across the top of the screen. The player is made aware of this time factor by a ticking sound as the alligator slowly snaps up fish during the 20-question game.

Both the sound and the graphics are motivating but do not distract the learner from the main task of solving the problems. Points are awarded for each correct answer and your child can add to the total by capturing extra numbers while

playing the bonus game.

The program is designed so that one child can participate. Scores for each child completing the bonus game will be displayed as the menu goes by. Related activities for reinforcing subtraction and division skills away from the computer are suggested.

Flip Flop

Math also has its more abstract concepts to be mastered. *Flip Flop* (game two on the disk) does a nice job of making the abstract more concrete.

The player is presented with two randomly created shapes and must determine with a keystroke if one should be flipped, turned or slid to fit perfectly on top of the other. Color, size and shape are all determining factors and the option that none of the manipulations are correct is also possible. Learners who get all ten in the

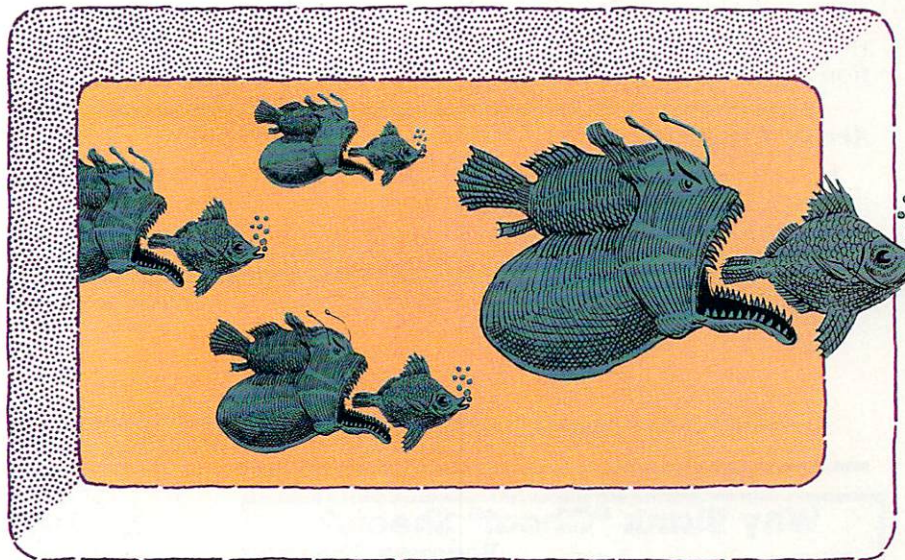
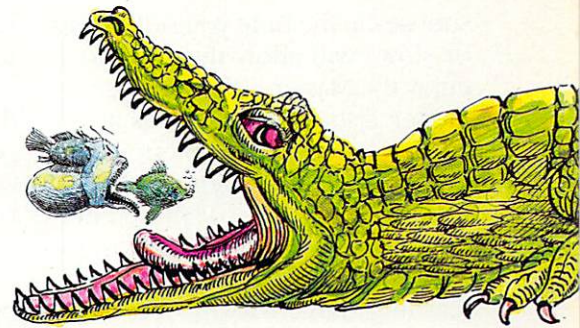
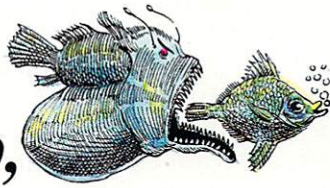
series correct are given a sound and graphics reward. Score is kept at the bottom of the screen during the running of the program.

Both *Frenzy* and *Flip Flop* come with easy to understand instructions and teaching suggestions. Also included is a reusable practice and score card. The game format of both turns drill into delight and encourages the student to try... just one more time.

Gulp

When the flashcards have long been forgotten but the basic facts still need to be mastered, sink a hook into Commodore's Milliken EduFun game *Gulp*. *Gulp* provides your child with practice in basic addition and multiplication facts at a variety of difficulty levels.

Twenty problems float by for your child to answer as a large fish chases a smaller one trying to eat it up as time passes. Correct re-



sponses in the time you select (fast or slow) will allow the child to enjoy the Master Fishers game. Master Fishers is offered as a bonus for perfect completion of the set of 20 facts. High scores for the bonus game are displayed in an early frame and serve to foster competition; a real motivator in learning elementary math concepts. There are unlimited chances to change incorrect responses and the problems are persistent until the correct solution is entered.

Arrow Graphics

From tying a shoe to finding their way home, kids have a need to understand directions. *Arrow Graphics* combines the difficult concepts of right and left with the

tricks to improve your child's mastery over them.

Players are asked to figure out the first three steps in the random pattern of arrows drawn by the computer. Those three steps are repeated at least three more times to create an intricate design in multicolor. Changing vantage point, from player to arrow, takes some practice but quickly becomes a challenge your child won't walk away from.

After successfully diagnosing ten patterns and having the computer highlight the proper arrow pathway, the child is rewarded with some free time to create original arrow graphics.

Incorrect directions are still executed by the program. The incorrect design is drawn in addi-

tion to the computer-generated path. This feature allows your child to contrast the path they have directed with the original. It provides a graphic explanation of corrections necessary and gives incentive for your child to try again.

The programs come with simple running instructions as well as related educational activities. Included you will find a reusable drill and activity card for those times away from the computer.

Arrow Graphics forces children to deal with the factual (right and left) and the quantitative (1,2,3) while it encourages them to use that knowledge to create designs confined only by their imagination. **C**

Why Blank "Cheat" Sheets?

Because They're Better Blank

O.K. So now you've got the best Commodore 64 in the world, and lots of complex software to run on it. One problem. Unless you work with some of these programs everyday or are a computer genius, who can keep all those commands straight? "F5" in one program means one thing, and "F5" in another program means something else. A few companies do offer a solution... a die cut "cheat" sheet that attaches to your keyboard with all the commands of one program printed on it. Great idea, unless you need them for 10 or 20 programs. You could purchase another disk drive for the same investment. Our solution? Simple. A pack of 12 lined cards, die cut to fit your keyboard and just waiting to be filled with those problem commands you forget most often. Simple? Yes, but effective. Now you can have **all** your program commands right at your finger tips on YOUR VERY OWN, custom designed "cheat" sheets. Order a couple packs today!



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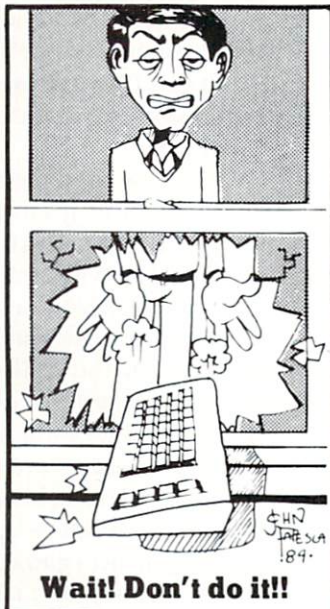
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The Globetrotting Computer

By Matthew Kiell

The airline tickets and passport are in hand. The bags are packed. Camera and film, guidebooks, an itinerary. Most important, your Commodore VIC 20, 64, or SX64, printer and software — integral components in your plans. You're set for a semester exchange at a Scandinavian university... or a three-week business trip to Japan... or (as in this writer's case) a year in Paris. Soon you'll arrive overseas, recuperate from the jetlag, plug in your personal computer and begin producing. Right?

Wrong!! Unless you prepare carefully and thoroughly, you may encounter any one of numerous pitfalls. And when the debris from the tumble is brushed away, you may need to invest a great deal of time, money and aggravation when you can least afford it before being able to sit down to compute. Or in a few extreme cases, you may be without the use of your Commodore.

The first problem is attitude — *your* attitude. Most people think, "This is a free country." Forget that illusion. Back in 1959 (after which they gave up counting) there were 1,156,644 (often complex) state and federal laws. Many affect travelers with computers. And worldwide there are millions more laws, bureaucrats and law enforcement agents. Don't fight it. Don't view yourself as a free individual being hounded and persecuted; in the real world, you aren't.

The story on international travel with personal computers has been fraught with misinformation, half truths and speculative answers. Such travel has unfortunately been made to appear sometimes far simpler and sometimes far more complex than it really is.

The hardest problem may be simply getting complete, correct information, for you've entered the mysterious world of bureaucracies — not one or two, but many of them. Each works in a separate realm, often unaware of the others, sometimes even of its own workings. Also some people will try to convince you that travel with a computer is as easy as carrying a suitcase full of socks; others will paint an ominous scenario. Don't believe either extreme.

To complicate matters, people you question may

not know how to deal with queries about computers. By now, your computer may be your best friend; you may think the computer revolution has arrived and settled in. But in the bureaucratic world the microcomputer still raises eyebrows and leaves people speechless.

This article doesn't provide all the answers for each traveler. Every country has its idiosyncratic rules and procedures, and the world comprises 169 sovereign nations and 46 separately administrated territories. But this article *does* address the primary areas you must understand for intelligent international travel with a Commodore computer, provides some answers and will lead you more easily to most of the others.

There is a lot to absorb here. Take a deep breath and prepare to dive into the deep, sometimes murky waters of international computer travel.

WARNING: This article is addressed to a specific, though common, class of travelers — those who (1) take a Commodore computer abroad for their own or immediate family's personal use, (2) won't resell or dispose of it and (3) will return home with it.

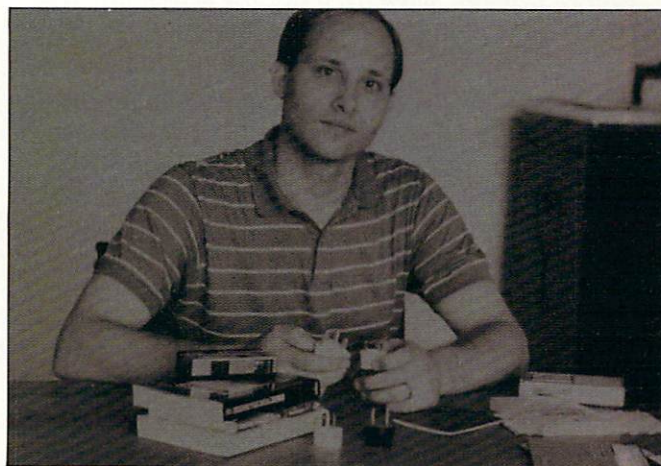


Photo By Denise Boneau

Author Matthew Kiell displays adaptors for each of four different non-U.S. electrical plugs. The three-pronged plug is the adaptor for Great Britain. The two-pronged plug he is holding is for continental Europe. The black plug on the table is another adaptor for continental Europe and the white one is for Australia and New Zealand.

Preparations

Before stepping out your front door, you should take several steps to prepare your computer for travel.

You wouldn't take your \$200 camera abroad without a protective case. Your computer equipment needs protection, too. Luggage, even hand-carried, absorbs a beating in the course of trip. The boxes you bought your equipment in can serve the purpose. But their design is not compact—a consideration for carry-on baggage. However, a specially made case will protect your Commodore just as well as a shipping box, in less space, with more style and less conspicuously. American Tourister, for instance, manufactures a case for VIC 20's and 64's, albeit steeply priced at \$130 (phone: 800-341-6311). Like most commercial cases, it has a comfortable handle that enhances portability—a definite plus when scurrying to Gate 38 at the far end of the airport.

Unlike buying a shirt, buying your computer just before going abroad is ill-advised. First, a brand new machine could arouse customs agents' suspicions concerning resale (more on that later). Second, most defects and difficulties show up during the 90-day warranty period. You want to be sure your machine has no problems before traveling. Third, you will want to know and be comfortable with your equipment. A business trip is no time for learning the subtleties of *Easy Script* or *The Manager*. And fourth, travelers to restricted nations need validated licenses (more on that, too, later). You can't apply before buying your computer, and applications officially take three to eight weeks to process but may take four to six months.

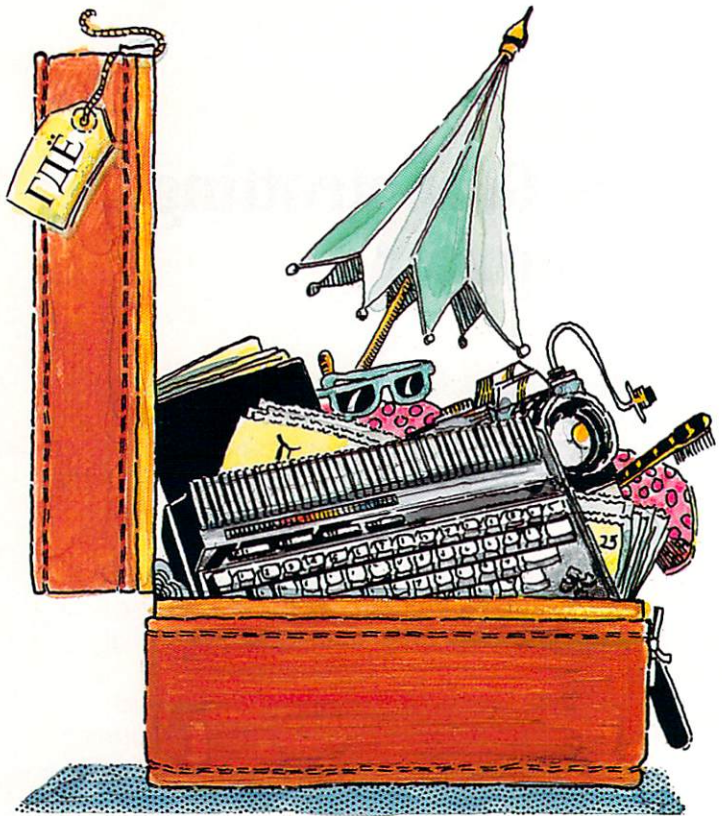
Before leaving, make back-ups for everything you can't afford to lose. Entrust those disks to someone you can contact in an emergency. If you are going where supplies will be scarce or nonexistent, take two or three times as many blank disks as you imagine you'll need, as well as several extra fuses.

Make sure to pack enough manuals to insure no major problems, but don't overload yourself. You received several pounds of them when you bought your computer; you probably have more now.

Commerce Export Law

Wherever you go, you will need a Commerce Department license for your equipment to leave the United States. However, for most travelers, that license involves no application.

John Boidock, director of the Office of Export Administration, states in a signed letter, "Personal/home computers are now defined to be personal effects and are eligible to be exported under General License BAGGAGE as stipulated in [the Code of



Federal Register, Title 15,] Regulation 371.6... provided that the computer is owned by and is intended for use by such person or members of his immediate family, and is not intended for sale."

Most people may carry a microcomputer as personal baggage—no questions asked. You needn't justify a need. If you want to take your Commodore to Cairo to use as a bookend, fine. A Commodore computer conforms to Commerce Department requirements concerning "reasonable and appropriate for personal use." They *would*, however, stop you if you tried to travel with an IBM mainframe, or technology with evident military applications or a computer designed for more than one person to use simultaneously.

Most travelers, if stopped by authorities, must finesse their way through an uncomfortable encounter armed with insufficient, confusing or wrong information. The facts would serve them better. Travelers to "free world" nations should know that General License exists and is theirs.

To those unfamiliar with commerce law, the term "General License" may be confusing. Laymen think of licenses as cards or written declarations granting permission to own or do something. It is broader than that. A license is the government's permission granted by statute. You receive no official document, card or certificate for a General License. But don't confuse it with a "right;" this permission *is* a license

bearing legal responsibilities.

Although no formally issued (that is, "validated") license is required to travel with a computer in the free world, export laws do require a Shipper's Export Declaration, available (for about 50¢) from the Government Printing Office (North Capitol & H Streets, N.E., Washington, DC 20401), Customs Service and Commerce district offices and most well-stocked stationers. The form is simple, but, as you fill it out, bureaucracy strikes! Two arcane facts are needed: your General License Symbol and the Schedule B Commodity Number(s).

The "symbol" you need here is "BAGGAGE." That simple, uppercased word on the Declaration "constitute[s] a certification by the exporter that the terms, provisions, and conditions of the general license have been met" (371.2.b.1). The Schedule B numbers (supplied by the Census Bureau — figure that one out) are 676.2700 for your Commodore computer (officially an "automatic data processing unit"), 676.2855 for a printer (an "input/output unit") and 676.2870 for a modem. Any item valued below \$500 doesn't need a Schedule B number. Fill out at least two, preferably more, copies of the Declaration and on departure present them at Customs (which may prove inconvenient) or at your airline check-in.

For more assistance with Commerce regulations, talk with an international trade specialist at the nearest Commerce office, or contact the Exporters Service Staff, office of Export Administration, Room 1099A, Commerce Department, Washington, DC 20230 (phone: 202-377-4811).

Many travelers never get stopped and questioned at this stage because the Commerce Department has few personnel enforcing their regulations. Another agency, the Customs Service, is obligated to implement most of Commerce's duties at ports of departure. But Customs has its own problems, and most of its agents are stationed at arrivals terminals, not departures. Therefore, Commerce laws are often not stringently enforced.

But in October, 1981, the Reagan administration implemented "an integrated Customs enforcement program to protect our national security by intercepting illegal high-technology exports including arms to Eastern Bloc countries": Operation Exodus. This hazily understood program has unfortunately acquired sinister overtones. But well informed travelers with microcomputers shouldn't find this bit of Cold War politics threatening. A recent Customs Service press release states, "Travelers leaving the country to most destinations should not have any problems when they take their personal computers or related instruments with them." The emphasis is far more on suspicious unaccompanied

shipments than on tourists' possessions.

Yet if a Customs agent sees your Commodore, enough curiosity will be elicited for him to stop and question you. No, you're not in real danger of having your computer detained or confiscated if you are properly prepared. Yes, 8,046 items *were* detained in Operation Exodus' first two years. But the 2,987 items actually seized averaged \$62,000 each in value.

What are "most destinations?" According to Commerce and Customs criteria (not Freedom House definitions), what is the "free world?" We can be more specific than the nebulous terms often batted about — "communist," "Soviet bloc," "free world." The Commerce Department places nations into seven "country groups" — Q, S, T, V, W, Y and Z (Reg. 370, Supp. 2). Canada is a special case, in no group and referred to by name in all laws; likewise the People's Republic of China. This list provides an interesting peek into U.S. international trade politics.

Group Q:	Romania.
Group S:	Libya.
Group T:	All North, Central, and South America, except Canada and Cuba.
Group V:	Southern Rhodesia, all countries in no other country group (except Canada and Communist China).
Group W:	Hungary, Poland.
Group Y:	Albania, Bulgaria, Czechoslovakia, Estonia, German Democratic Republic (including East Berlin), Laos, Latvia, Lithuania, Outer Mongolia, the USSR.
Group Z:	North Korea, Vietnam, Kampuchea, Cuba.

John Boidock at the export administration office states, "The use of the General License BAGGAGE is permitted for exports of personal/home computers to free world destinations in country groups T and V [and Canada] only." As the list shows, however, that covers all but 19 nations (three of which are *de facto* Soviet states). For travel to any of these 19 nations, a validated license is required. (Notwithstanding a *New York Times* article's claims, Yugoslavia is a Group V nation.)

If you plan to visit a "controlled destination," you must submit an Application for Export License (Form ITA-622P) to the Commerce Department; regulations 372.4-8 detail how to apply. (Free world travelers may apply, if desired.) You should write the following (from 372.8.c) on the application under "Additional Information" [Item 15]: "The commodities described on this application are to be temporarily exported for (state purpose of export) and returned promptly to the United States after



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their use abroad as authorized, unless other disposition has been specifically requested and authorized in writing by the Office of Export Administration." Under Item 7, list yourself as the "ultimate consignee." And under Item 12, provide a strong explanation of your need for your Commodore computer, preferably with documentation. Also you will need the Export Control Commodity Number; for electronic equipment, it's 1565A.

The license, if granted, is for one year (though renewable). How likely is license approval to an individual applying to a restricted nation? According to Tom Slietk of the Exporters Service Staff, "Normally they would get it, but it's decided case by case. It depends where you're going and the sophistication of the equipment. For instance, if you're a professor going to a Polish university engaged in lots of nuclear work, you may be turned down."

If confronted by an overzealous (and underinformed) Customs agent with seizure in mind, stay cool. Present a copy of your Shipper's Export Declaration and/or validated license, then use the following to document "personal use" and your right to carry your Commodore as a personal effect: your airline tickets, proving your primary destinations; receipts, indicating the computer's age and your ownership (the computer's serial number on the receipt is helpful); a Commodore 20, 64 or SX64 brochure (it describes the computer); this article, so you can cite Commerce and Customs laws and procedures.

All of these items will aid you again when you reach foreign customs agents.

U.S. Customs Law

U.S. Customs comes at the end of your travels. But much of your dealings with Customs must be handled at the beginning. Customs is there to regulate foreign commodities, making sure items originating overseas are both legal and properly regulated. Thus their two primary roles are confiscating contraband and collecting import duties. (Operation Exodus was a supplemental job they got because of their years dealing with smuggling.)

You must make sure that Customs on your return home doesn't mistake your computer for contraband or a foreign-bought item. To do this, you register your equipment on customs Form 4457 before departing. (This procedure has nothing to do with licenses for *leaving* the United States, discussed in the previous section.) You can register at the airport Customs office just before departure. However, those offices follow business hours (Monday-Friday, 8:30 a.m. to 5 p.m.) that barely overlap with the busiest international departure periods. A truly efficient system. Some offices have

slightly longer hours: New York operates from 8 a.m. to 5 p.m.; Chicago 8 a.m. to 5 p.m. including Saturdays. But most east coast overseas flights leave more than 90 minutes after closing time, and most west coast flights less than 90 minutes after opening. Also, these offices can be inconveniently located in or near *arrivals* terminals, not departures. At some international airports (e.g., Kennedy in New York), customs agents are stationed at major airline check-in counters until midnight.

A less nerve-wracking option than scurrying about the airport on departure day is to go some-time earlier either to a port of departure or one of the 45 Customs Service district offices, *with your equipment*, to register.

Actually, your Commodore computer itself doesn't absolutely need Form 4457 registration. It's American-made and labeled "Made in USA." But if you own any foreign-manufactured accessories, you should definitely register.

A less official last resort is a homemade approach. Leaving the bottom third of a sheet of paper blank, make a complete list, stating purchase dates and locations. Make several photocopies. Sign and date every copy. Have a notary public notarize them all, for from 50¢ to \$5 per seal (the blank space will simplify the notary's job). It isn't as legally airtight as Form 4457, but should satisfy Customs, and that is the bottom line. Vincent Cheffo, an import specialist at Kennedy Airport, states that receipts may even satisfactorily prove previous ownership.

Getting Through the Airport

For many, a big problem will be just carrying a computer and accessories — and the other baggage (remember, that's there, too) — down endless airport corridors, even with the aid of strap- or handle-equipped cases or wheeled luggage carriers.

Plan your time accordingly; pad your departure day schedule with a lot of time to negotiate the airport obstacles and still make your flight.

At security checkpoints, remember what you are carrying. Personal computers are designed to be black boxes — users slip disks into hidden drives, tap the keys and watch the screen. If everything goes right, owners never look inside, ever. To you, this is a wonder of technology. To airport security, it sets off mental alarms. Anything could be hidden inside. When the inspector asks about your box, don't reply, "It's a personal computer, dummy. Can't you see that?" He can't. He sees a potential bomb or contraband container.

Therefore, know how to open your computer safely. Have your dealer give a lesson as well as a brief tour of the interior to prepare you to do the same with an inspector. If you can't open your com-

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puter for inspection, the guard will if he so desires. Do you want a Bangladeshi border guard, who may never have seen a computer before, attacking your computer's insides?

Travelers have reported that security guards sometimes want a demonstration, either to find out what the computer is or perhaps to make sure it works and that the TV tube doesn't contain heroin. Be ready to plug in (if the electric power supply at the security post is compatible with your computer) and show a few work files.

Airport x-ray machines are a continuing controversy. You will encounter them in almost all U.S. airports on departure and often at foreign customs on arrival. According to Commodore's service department, the x-ray machines will not damage your computer. Whether the machines' x-rays and magnetic fields endanger disks remains under dispute. Memorex test engineer Bob Cassidy has been quoted as saying, "Short of getting a super-strong electromagnetic field right next to the disk carrier, it would be almost impossible to change data on a disk." But Satellite Business Systems' Lewis Ray is wary of how finely adjusted the devices are and how strong the field may be.

Commodore's service people consider the walk-through scanners the safest device; the carry-on baggage scanners are perhaps a bit more hazardous. They also note that putting all of your disks in your checked-in luggage is a bit of a gamble; airports occasionally subject random bags to high-power radiation. Hand inspection of disks followed by passing them around any scanning devices remains the preferred procedure.

But hand inspection is not an inalienable right. If inspectors wish to subject your possessions — all of them — to x-rays (and thorough searches), the law and the sheer force of circumstances favor them. Your only recourse is friendly persuasion. Other situations in your travels may warrant displays of anger, indignation and power; airport security is not one of them. International correspondent David Kline once wrote about the unenviable experience of facing a rifle-toting soldier at Customs in Karachi. Don't be in a rush to get through.

The Swiss and Parisians are among the few who are adamant that everything — hardware and software — must be x-rayed. They insist their machines are safe. In most other nations, friendly requests eventually are honored, at least for disks.

In Flight

Airlines have size limits for carry-on baggage; bags must be small enough to go under your seat. Most commonly, the dimensions, added together, may not exceed 45 inches. An American Tourister

Commodore case (for VIC 20's and 64's) measures 23" × 15-3/4" × 7-1/4" — 46 inches overall; an SX64 measures 16" × 14.6" × 5" — an impressively small 35.6 inches overall. However, most commercially manufactured cases measure just over the 45-inch limit. Also, airlines further stipulate maximum, for each dimension, cutting down the actual limit. Delta's height maximum, for instance, is 7 inches. Some airlines are even more restrictive. Icelandair officially permits 13" × 13" × 8".

Some people assume that having the computer under their seat will be cramping, and worry that their every move may be a kick in their Commodore's side. University of Chicago biologist Jeanne Altmann, however, prefers her computer there for her flights to Kenya, often 24 hours long, finding it adds comfort by acting as a footrest. And although promotional brochures talk of stowing it overhead, some types of racks would be dangerous; I've flown when racks spontaneously popped open every 15 minutes, dumping their contents.

Most airlines have some cabin storage for garment bags and the like. Sometimes you can arrange to stow your equipment there. But many airlines absolutely refuse to use the space for anything but garment bags.

Unlike at airport security, where pressure tactics are not advised, travelers should remember they have some power — the power of the purse. Your patronage now and in the future is wanted. If airline personnel see your computer and say, "No, it can't come on board," note the computer is under 45 inches, then indicate that if it doesn't go on board, you don't. Threaten to switch airlines. Don't let them strong-arm you into shipping it as cargo. Unless you have carefully packed, padded and sealed your Commodore for such handling, it is in mortal danger. Whether or not baggage handlers are the gorillas portrayed in TV commercials, they aren't trained to coddle computers. Their jobs are speed and volume oriented, which runs contrary to providing tender loving care.

Sometimes, though, equipment simply can't be taken onboard because it is too large. Then you *must* turn it over to the gorillas. In such cases, your original packing box may be sufficient, with its protective foam, but (unfortunately again for your wallet) a commercially-made shipping box may be in order, such as those made by ATS Cases of Natick, Massachusetts (phone: 617-653-6724). It is often the only smart route for items that are too large to take onboard as carry-on luggage. They run from \$100 to \$300.

Foreign Customs and Carnets

Rarely, if ever, must travelers entering a nation

pay duties on any personal items they intend to take with them when they leave. But to ensure against your selling the equipment in their country, most nations' customs *policies* require a security deposit (a "bond"), usually equaling the applicable duty and taxes. In West Germany it's 5.7% of your equipment's value; Holland, about 31%; Iceland, just 1%. In nations with rampant inflation or very tight import regulations, the security can be extremely high: 60% in Jamaica; 60-110% in Kenya; 110% in Israel.

If you plan many border crossings or your time abroad will be precious, the answer may be an International Chamber of Commerce ATA ("admission temporaire/temporary admission") Carnet, an international customs document that simplifies customs procedures. It's used mostly by professionals and business people and is both a customs entry document and customs bond, guaranteeing that all duties and excise taxes will be paid if the item is not exported within the prescribed time.

The one-year, non-renewable carnet is honored in at least 39 countries, including all of Europe except the USSR and Albania (and perhaps Andorra, Liechtenstein and Malta). If your plans involve traveling in non-honoring nations or more than a year abroad, don't consider it.

Carnets are not cheap. One that covers \$500-\$4,999.99 in merchandise costs \$100. Also, a deposit of 40% of your items' value is required. A \$20 insurance policy can satisfy this and may be simpler than tying up \$500-\$1,000. Applications are processed through the U.S. Council for International Business — in New York, the Chicago suburb of Schaumburg, Los Angeles and San Francisco.

As an alternative, a customs broker in the nation you will visit can bond a customs entry; a reputable broker in America can get a name and address. Yet a third option is a bank letter of credit or certified check. This option requires your freezing a large amount of money in a bank account, but at least it is yours and earning interest. A classic Catch-22 exists with this option, however. For what amount do you make the bond or letter of credit? You must do it in advance, but the amount of duty/security is determined when you go through customs. Also, if you plan to cross many national borders, this option is not practical.

As mentioned earlier, your equipment's age can be important. In Australia, for instance, if it's more than a year old, customs passes it without duties or deposit if you declare it for personal use.

Foreign embassies (in Washington, D.C.) and consulates (usually in New York, Chicago and on the West Coast) can be curiously unhelpful on customs matters; they are best for very basic questions and addresses. National tourist offices may prove help-

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ful, though more on other matters than customs. And binational commerce associations can be useful. But, if possible, contact the Bureau of Customs in the nation(s) you will visit.

Ask about security deposits, their permitted form, their amount, whether the ATA Carnet is accepted and whether a Commodore computer entering their country temporarily for personal use is exempt from duties or security deposits. Emphasize the item's personal nature; mention its age. The result may be frustratingly inconclusive. Or you may get official permission to enter a country without depositing security, as I received from Icelandic authorities when I explained my circumstances.

This is all policy, however — not day-to-day practice. Many travelers tell customs agents that their computer is "like a typewriter." International correspondent David Kline, who used a microcomputer in Afghanistan and Pakistan, used the term "Hollywood typewriter," delivered with a smile. He also showed brochures, proving its "innocent albeit complicated nature," to give "visual proof that the computer is... a consumer item."

The "typewriter" explanation may not help much in Bulgaria, though, where the government requires registration of all typewriters and has confiscated many as subversive instruments. And many Iron Curtain customs agents will suspect CIA ties of any American with any high-tech equipment.

Such nations notwithstanding, travelers usually clear customs without placing any bond and without carnets or special dispensations. This is obviously a gamble, depending on the trade atmosphere at the moment and the agent's disposition, but most seasoned travelers suggest not a large gamble. The odds favor you. Lose, however, and you can lose big.

The U.S. Passport Office, Department of State (Washington, DC 20524), may also aid you with information on foreign nations. They publish "Country Information Notices" for many areas, as well as nine free booklets titled, "Tips for Travelers to..." including booklets for Cuba, Eastern Europe, Communist China and the USSR.

Sing the Computer Electric

You've negotiated the labyrinth of government and security officials. You've surmounted the mountain of bureaucratic paperwork. You are at your destination, unpacked, refreshed and ready to work. Finally! Right?

Well, not quite. You still need safe, dependable *compatible* electricity. Without it your computer equipment is indeed an expensive paperweight.

Except for some of the western hemisphere (Canada, Mexico, some of the Caribbean), most of the world does not use 120-volt, AC, 60 Hz power

or an American-type outlet plug. Much of the world runs on approximately 220 volts AC at 50 Hz. Britain runs on 240-250 volts; some regions use 110 volts at 50 Hz and other unique voltage idiosyncrasies abound. And there are four standard types of plugs.

Lists of electrical currents worldwide often label nations "110" or "220." But the small print usually mentions that "110" means 110 to 160 volts and "220" means 200 to 260 volts. A useful starting point is the (albeit promotional) booklet, "Foreign Electricity Is No Deep Dark Secret," printed by the Franzus Company, 352 Park Avenue South, New York, NY 10010. Just send a stamped, self-addressed business envelope.

Travel books are mildly helpful but surprisingly lacking. National tourist offices, consulates, embassies and trade commissions may help, but all provide somewhat idealized information. If possible, also find a few well informed people who have lived where you plan to visit.

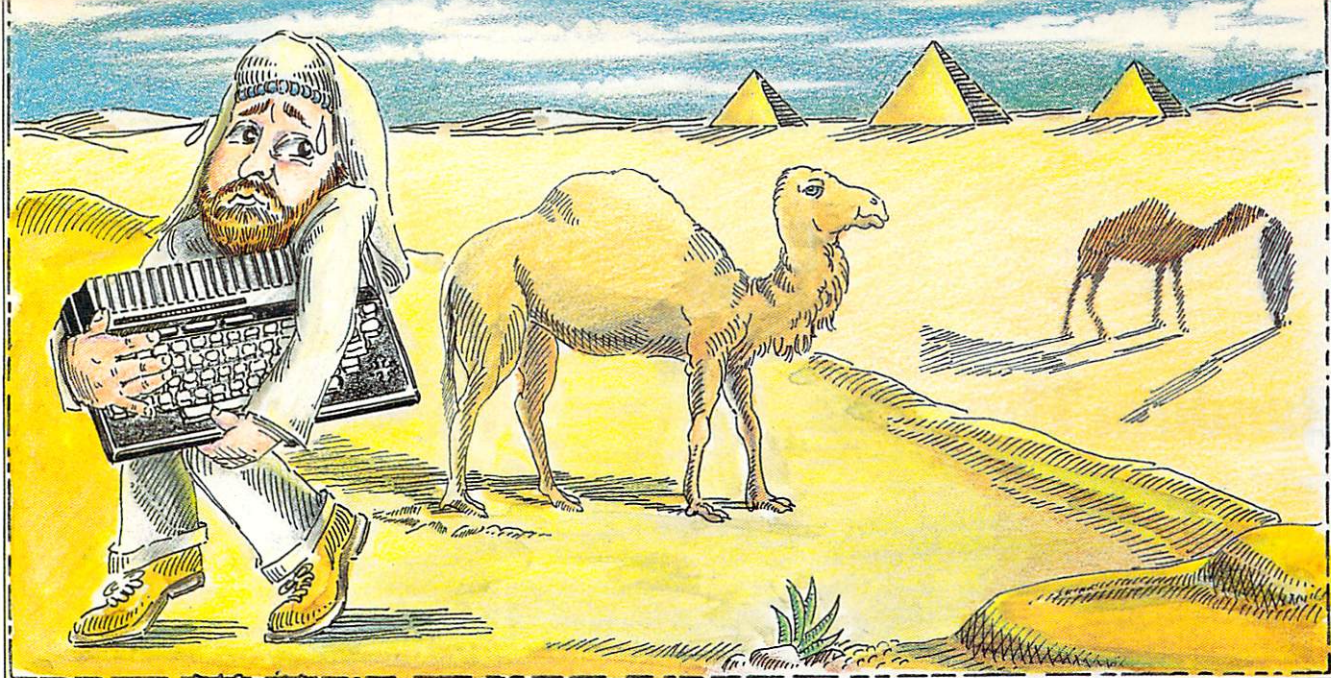
According to Commodore's service department, Commodore guarantees their computers' operation within a 105-125-volt range (210-235 volts when set for 220 and a similar range for British 240-250). But some places, as I've hinted, are beyond safe limits. A few remote parts of Denmark still use 380-volt power. And, though most of Colombia is 110-volt, Bogota, the capital, is an unusual 150 volts. And perhaps the most important voltage anomaly is Japan's 110 volts. Special transformers are needed for these nations. And DC power is still found, although rarely.

How you approach the electricity problem depends on your computer. One set of rules applies to the VIC 20 and 64, another to the SX64.

The VIC 20 and 64 have external power boxes that convert 110-120-volt AC current to 12-volt DC. The simplest approach is to buy a power box made for the nation you'll be visiting. That purchase will have to wait until you arrive abroad. Writing to the distributor in that nation beforehand for details may be advisable. (Distributors' addresses are available from Commodore International Sales in the Bahamas — Shirley & Victoria, P.O. Box N-10256, Nassau, Bahamas 20240; telephone 809-324-3373.)

Option two is an isolation auto transformer, available from most major electronics suppliers in the United States and even more readily available in major department stores in Europe. They range from \$14 devices to \$150 ones that will support a whole system.

But a problem remains: your monitor. Take it with you and you'll need a transformer (forcing you to choose the expensive end of option two). Your monitor will then work, but a line will constantly migrate down the screen because of the asynchrony between your 60 Hz set and the 50 Hz current.



You may think, "I'll buy or rent a monitor there." Don't. Your American computer would require major circuitry changes to work with the foreign set.

The SX64 is an entirely different matter. It's a single unit with an internal power source. Unlike some computers, it has no voltage switch, external or internal. You will need to use an isolation auto transformer. Wherever you go, be sure you have a transformer designed for the voltage where you are traveling.

WARNING: The device you need is an *isolation transformer*. Don't confuse this with what's available from the Franzus Company or Radio Shack, which is a *converter*. Though okay for most small appliances (contact lens sterilizers, shavers, etc.), the \$20-\$25 converters cannot be used with electronic equipment, though they work with battery rechargers. They create a "square wave," crudely chopping off the tops and bottoms of a wave to change 220 to 110.

Finally — yes, there's more — you may need a plug adaptor to adapt your American plug to fit a foreign socket. You needn't do as a writer in *PC World* did; he cut the plug off. Large hardware stores, luggage shops, electronics stores (such as Radio Shack) and big department stores carry the four types of plug adaptors (one adaptor for about \$2.50; sets of the four varieties for about \$7.50).

But remember that these adaptors are for two-prong American plugs, not the three-prong grounded plugs on your equipment. Adaptors for three-prong plugs are available, but harder to find. Otherwise, you will also need 3-to-2-prong adaptors, preferably with long ground wires.

You must also remember any peripherals, especially if they are not Commodore machines. They may need a different method of adaptation than your computer.

Another more circuitous option does exist. It involves a popular convertor, a 12-volt DC battery and a 12-volt DC-to-110-volt-AC convertor (with a power drain warning light). This is a particularly bizarre setup for VIC 20's and 64's. The battery drain with such an arrangement will be high, necessitating frequent recharging.

Is electricity where you're going dependable and steady, however? Blackouts and brownouts are common in most Third World nations. Many Caribbean islands frequently lose power. In Nepal they come daily. Even some industrialized nations have erratic power. I was warned that Parisian electricity varies and can create problems. Italian power, though officially 50 Hz, actually runs between 42 and 50 Hz. The lower level is dangerously below most computers' stated range of 50-60 Hz and may eventually burn your computer out.

Travelers to tropical regions, especially those with SX64's, should consider strongly some sort of battery. And in all circumstances, battery power (beyond the strange option already described) is worth investigating. It circumvents erratic power supplies and blackouts and the DC current runs your computer cooler, avoiding the overheating that can be a real problem in hot, humid climates.

But in extreme situations you will have no power lines available. What then? Biologist Jeanne Altmann has conquered that problem in rural Kenya. "We run our computers and printers off solar panels in the field and keep them in a thatched-roof adobe building. Our main problem is dust protection, for the printer more than the computer."

Last, back in civilization, a bit of irksome trivia. Many European hotels provide no free sockets for patrons. Lamp wires run directly into the walls, or the plugs are permanently fixed in their sockets because European electricity is so costly.

(Continued On Page 117)

Random Thoughts

Part 7: Fun and Games

By Mark Zimmermann

The last few articles in this series have gotten a little mathematical. There's a need for math and I'll get back to it in future columns. This time, though, I want to discuss some applications of random numbers to that popular subject, computer games and recreations. Far too many games and audio/video demonstrations are totally predictable — they should have some random elements in them for variety!

Levels of Randomness

Many of you have played *Pacman* in the video arcades or on home computers. As you probably recall, the original *Pacman* had no random factors in it. Once you learned the patterns to move along, you would never lose. You could even play blindfolded if you knew the timing of the pattern moves well enough. This lack of variation made the original *Pacman* a rather dull game after a while.

Many computer programs to play chess and other games have a similar lack of variation. Once you figure out a winning sequence, you can be sure that the dumb machine will fall into the same trap time after time. You can handicap yourself, perhaps playing a bad move once in a while, in order to keep seeing new variations... but that's not much fun.

What's needed in all of these cases is randomness (in a calculated way). And there are many degrees of randomness, all of which should be considered.

Take chess as an example. At the lowest level of randomness, a program should use a random factor to decide between two moves which seem to be equally strong. This is a common technique in modern microcomputer chess programs and it gives some variety in most games, as long as equally strong moves come up fairly often in the program's decision process. Going a step beyond this, at the next level of randomness, a program should *occasionally* play a move it thinks is plausible but clearly inferior. This kind of choice should happen randomly at least once or twice per game. Such a strategy would keep the machine from falling into the same deadly trap over and over.

At a still higher level of randomness, a program

should decide its overall strategy according to a random factor. In some games, it should play aggressively; in others, defensively. It could vary the settings of its internal parameters in a random pattern within reasonable limits. For instance, a rook could be valued as somewhere between five and six pawns, instead of having a fixed value of five. Some amount of variation could occur within a game, too, but that should be less than the variation between games. It makes more sense to play a consistent strategy. The human opponent doesn't get the feeling that he/she is playing a manic-depressive that way.

The higher we go in levels of randomness, the more human the program is becoming. At the next level, it should begin to remember from game to game and learn from experience. Since previous games and experiences have random components in them, the result will necessarily be random to some degree. A copy of the program owned by a grandmaster might become a considerably stronger player than one owned by a rank amateur.

If we go much higher in randomness, our program will no longer be merely a chess program! It will get into real artificial intelligence, where it tries to understand its opponent and take advantage of his/her weaknesses. The program will also evolve as time goes by, perhaps mutating into something which the author won't even recognize! It may refuse to play chess any more or start to make up variations on the game where the pieces have different powers and patterns of movements and the players have goals other than checkmate. Science fiction stories have been written along these themes. They may become true within the near future.

Random Automated Games

If you recognize the many possible levels of randomness, you can use them effectively to add interest to your programs. I almost always begin at a low level and work upwards. It's easiest to insert random elements in a structured program where key events occur in subroutines which can be modified without changing the rest of the logic.

I frequently like to leave a computer running with an interesting display. That sometimes makes it easier to explain to visitors what I'm doing and it gives me something to look at besides a blank screen when I'm daydreaming. One fertile method for generating interesting, dynamic displays is to automate a game. Design a strategy for the computer to play against itself. This works particularly well with visually oriented games with lots of dynamic action.

Recently, for instance, I automated the game *Deflection*, a classic that was first programmed for the old Commodore PET in 1978 by Fred Dunlap. The game simply displays a ball (as in *Pong*) which moves horizontally or vertically across the screen and bounces off the walls. The human player has to hit the slash or backwards slash key to lay down deflecting barriers which change the ball's direction of motion when they are encountered. The goal is to control the ball's motion so that it hits and destroys the targets which are scattered across the initial display. Nice sound effects accompany each bounce of the ball.

To automate *Deflection*, my first thought was simply to let the computer randomly throw down a slash or backwards slash once every ten seconds. (That is, I began at the lowest level of randomness with simple random moves.) I inserted the randomly generated choices at the point in the program where the player's move was sensed. This seemed to work for a while and gave nice visual results. But after a few tests, I discovered that the random moves occasionally got the ball stuck into a closed loop pattern of moves from which it never could break out. That was unacceptable... it made the game degenerate into a boring repetitive sequence.

I got out of that trap by moving to a higher level of randomness. I altered the rules of the game so that the computer had powers that a human player didn't. I let the machine break out of simple closed loops by writing over its own previously placed moves. That worked for awhile, until I ran into a situation where a very complicated loop developed. The loop had a period of exactly ten seconds. But whenever the computer made a new move, it fell on top of the move it had just made. Unfortunately, neither choosing a slash nor a backwards slash got the machine out of that trap!

To escape, I inserted an idea from another higher level of randomness. I made the machine's strategy a bit more random itself. Instead of a new random move every ten seconds, I made the computer move at a random *time*, distributed between ten and 20 seconds apart. With that modification, it now plays a visually interesting game and never gets trapped into a dull infinite loop.

(Continued On Page 81)

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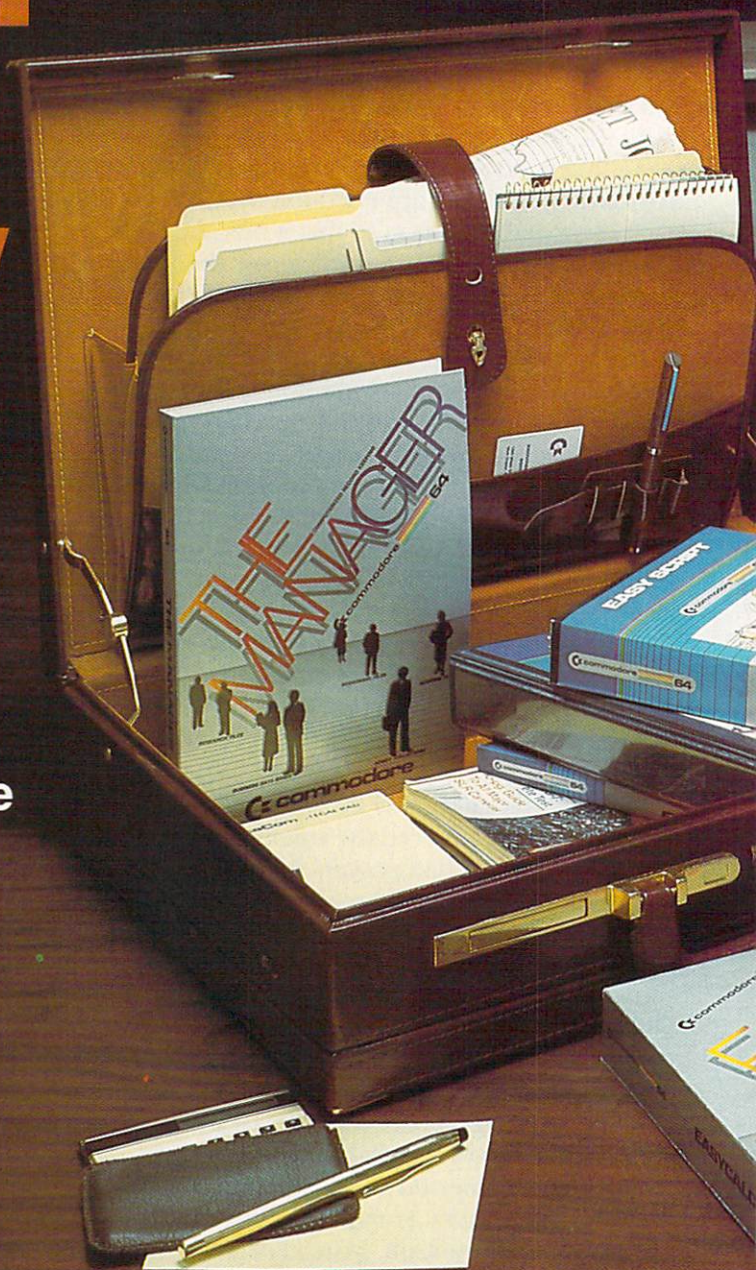
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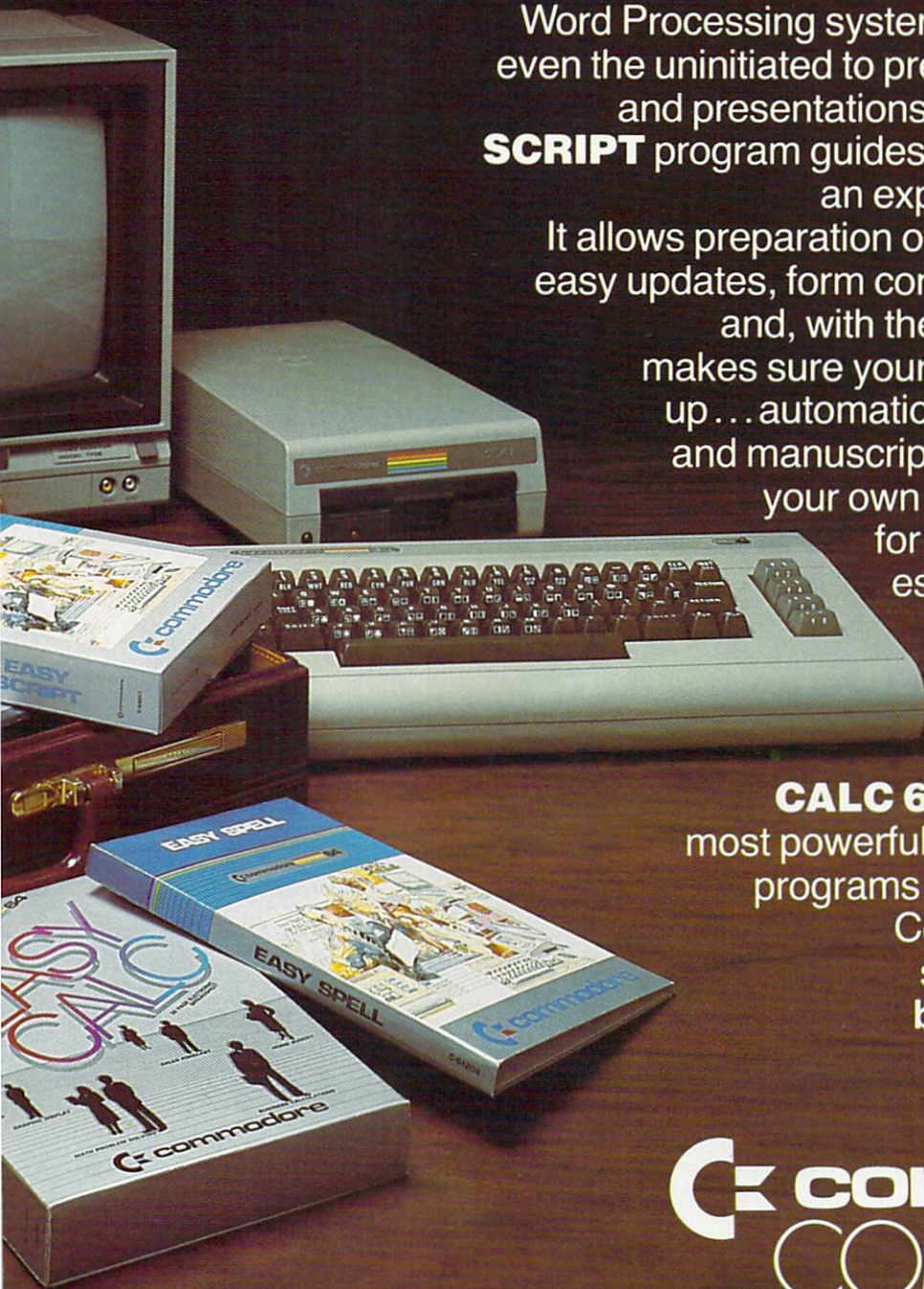
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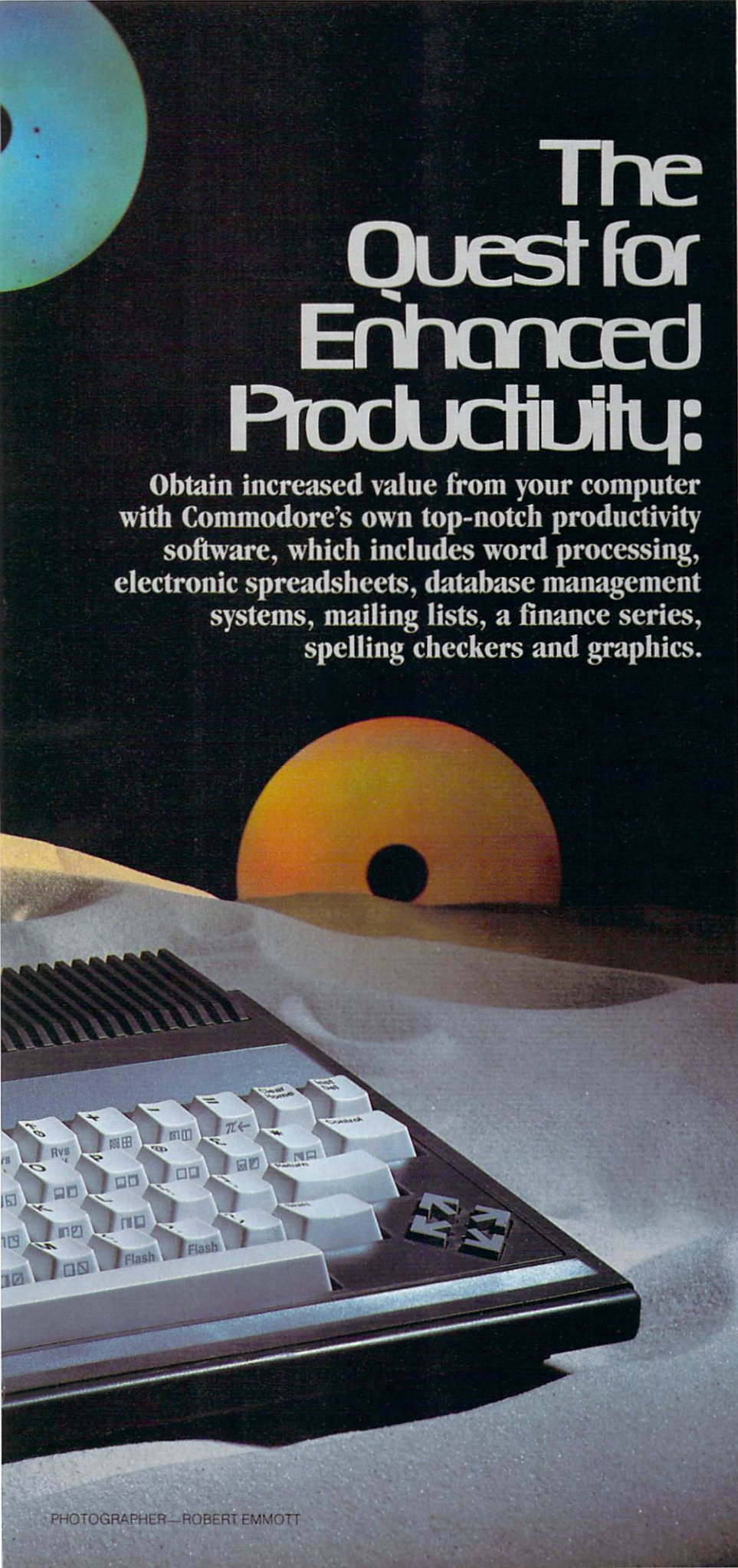
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COMMODORE MICROCOMPUTERS
SEPTEMBER/OCTOBER 1984

By Paul Goheen,
Tom Ziegler
and
Lynn Kachelries
Commodore Software

Commodore Meets the Challenge

Integrated Software for the Commodore Plus/4 Computer

Over the years, Commodore has become number one in the world of microcomputers largely because of its commitment to providing the best computer at the best price.

Commodore's newest micro-computer, the Commodore Plus/4 (formerly called the 264), has been designed to continue this commitment by including the latest in productivity. Its productivity software features include built-in word processing, database, spreadsheet and graphics. In addition, it also provides enhanced BASIC, 64K memory and programmable function keys, one of which software authors can use to provide an easy link to explanations about their products.

The integrated productivity software built into the Plus/4 computer includes four programs: a file manager, spreadsheet, word processor and a graphics program.

The file manager allows the user to collect, store, organize and retrieve information such as mailing lists, inventories, personal files, business files and recipes. Sorting information and reorganizing data is especially useful in creating form letters, labels and reports. It also allows the design of individual applications without having to program the computer

or learn any complicated commands. It is integrated to work with the word processor.

The spreadsheet offers a giant electronic spreadsheet that automatically performs complicated calculations and projections. This powerful calculation tool is ideal for home or business budgeting, sales projections, management decisions, loan/mortgage charts, profit/loss statements and income tax records. Every time a number is changed, the spreadsheet recalculates the entire spreadsheet. This program is also integrated to work with the word processor.

The word processor allows the user to write letters, reports, student papers and any other text without additional software. Computerized editing makes it easy to revise text on the screen before printing. Documents can be saved on standard floppy diskettes so they can be recalled for reprinting or updating. The word processor is integrated with the spreadsheet so calculation sheets from the spreadsheet program can be moved into the word processor to be included in a written report.

The graphics software is integrated with the spreadsheet so calculations can be visually displayed and evaluated. It also has over a dozen new BASIC commands which make it easy to program high-resolution graphics in color and save them on disk or tape. It is capable of drawing circles, boxes and complex shapes and images.

For example, suppose a letter is created on the word processor and then calculations are performed on the spreadsheet. With one command, those calculations can be mapped into the body of the letter anywhere desired. This integration also helps when one has created a large file of names and addresses and wishes to prepare a mailing. First select and sort the data on the file manager, then create a letter on the word processor, placing markers where the data from the filing system should appear. Finally, print out as many

letters as selected.

The word processor and spreadsheet can also operate together in split-screen format. Integration allows them both to be visible at the same time on separate halves of the screen. The graphics are designed so you can graph a row from the Spreadsheet into the Word Processor and have it become part of a larger document (with or without other mapped-in portions of the spreadsheet and filing system).

The software built into the Plus/4, in short, follows the same path as the *Lotus 1-2-3*, but takes only 32K of ROM as opposed to the 192K ROM required by *Lotus*.

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The Manager, Commodore's own database for the Commodore 64, can help collect and organize information in your home or business. In your home, *The Manager* helps organize your checkbook, stamp collection, Little League team, investments, Christmas card list or recipes. In your business, *The Manager* can keep track of inventory, personnel, accounts payable, sales or accounts receivable.

It also provides information that was previously unavailable because manual methods of obtaining the information were too time-consuming. It organizes data in a consistent format and allows you to tailor applications to your needs.

The Manager is an electronic filing cabinet, but unlike the files in a regular filing cabinet, these files can be sorted, reorganized, manipulated and scanned at any

time. Sorting and reorganizing are done at computer speed with little or no operator intervention.

Easy Calc

A spreadsheet is a computerized version of an accountant's pad. But instead of having a pencil and calculator to perform calculations, you use the computer's keyboard and video screen.

The basic component of a spreadsheet is a cell, which is the intersection of a row and a column. Cells can hold text, numbers or formulas. Numbers in a cell can be added, subtracted, multiplied or divided. A column or row of cells can be summed and the answer stored in a new cell.

Uses of a spreadsheet include budgets, checkbook, register, loan and mortgage calculations, stock price tracking, profit and loss statements, income tax preparation, expense reports and sales projections.

The primary benefits of a spreadsheet are its ease of editing, its reusability, accuracy of calculations and legibility.

Easy Calc, Commodore's own spreadsheet for the 64, is easy to use, with versatile editing functions and several help screens. It allows the printing of bar charts and individually formatted tables. *Easy Calc* also allows the viewing of four pages at once on the screen.

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Easy Finance

The *Easy Finance* series consists of five separate packages covering a wide variety of financial areas. Altogether, the *Easy Finance* packages provide over 70 useful calculations that can be

applied to both home and business. They provide the tools which allow one to make sound financial decisions and plans for future expenditures. The *Easy Finance* programs are easy to use. Prompts lead the user through each calculation in a step-by-step manner.

Easy Finance I handles loan concepts. The 12 loan calculations are applicable to many situations, whether at home or in business. Use this package to determine such things as the remaining balance on an existing loan, the monthly payment on an anticipated loan or your mortgage amortization schedule.

Easy Finance II deals with basic investments. There are 16 basic investment calculations ranging from determining the future value of an investment to ascertaining the internal rate of return of an investment.

Easy Finance III continues basic investments. The 16 advanced investment calculations are ideal for the business environment. Use this to determine the current value of a treasury bill or the financial management rate of return on the maximum price of an acquisition or merger.

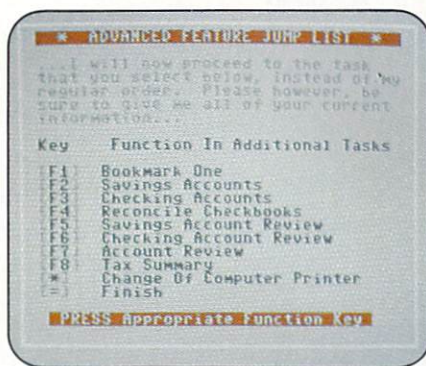
Easy Finance IV deals with business management. The 21 business management calculations provide fast, reliable answers to determine, for example, whether to lease or purchase an asset, or to find out when a depreciation switch from declining balance to straight line would allow for larger depreciation amounts in the later years of an asset's lifespan.

Easy Finance V shows how to make the most out of statistics such as payoff matrix analysis, regression analysis forecasting and apportionment by ratios. It is completely preprogrammed.

Easy Spell

Easy Spell for the Commodore 64 produces flawless writing by offering automatic corrections of spelling errors. It also counts the words in your manuscript. It has a built-in 20,000 word-lexicon that

lets you add words that are not already stored there and it is designed to be used with *Easy Script*, Commodore's word processor for the 64. It can be adapted for writing reports in specialized fields such as medicine, law and science.



Silent Butler

The *Silent Butler* is a home accounting product for the Commodore 64 which allows you to pay bills, accumulate yearly tax summaries, keep track of birthdays and anniversaries and reconcile your checkbook in a very simple manner. Information for three checking and three savings accounts can be kept for each year.

A special feature of the *Silent Butler* is the patented Checkholder included with your program. Your payments are typed right onto your own personal checks so there is no need to purchase special printed checks. Using the *Silent Butler* program, the needless duplication of home bill paying can be eliminated.

Accounting Series

With Commodore's accounting series software, your Commodore 64 computer can be turned into a business computer.

The *General Ledger* offers eight general ledger options including 1500 transactions, 150 charts of accounts and posting. Featured is integration with other accounting modules, custom income statement, trial balances and full reports.

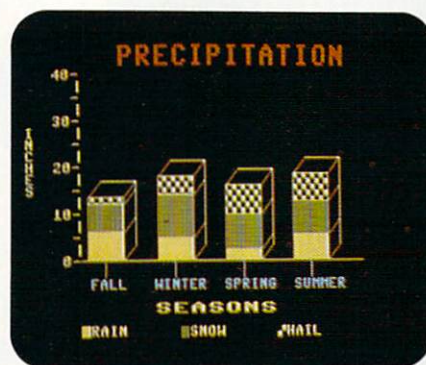
Accounts Receivables/Billing includes 11 billing functions, 150 invoices, 75 customers and 40 transactions/files. *Accounts Receivable* features billing, credit

and aged receivables. It also provides printed statements.

Accounts Payable/Checkwriting combines tracking of vendor payables with an integrated check-writing system. It is interfaced with other accounting modules.

The *Inventory Management* program computerizes tracking of 1,000 inventory items, stock receipts, issues, orders and adjustments with printed reports. It calculates use reorders, economic order quantities and cost averaging. It is useful for all types of inventories including personal collections and insurance lists.

Payroll is for businesses with 50 employees or less. It offers 24 different payroll functions. Payroll checks include federal, state and other deductions. It is integrated with *General Ledger*.



B/Graph

Commodore's *B/Graph*, available for the Commodore 64 and planned for the Plus/4, is a professional analysis program. It was designed to be used by individuals in sales, marketing, administration, forecasting and general management as well as in home and small business applications. Educators, students and hobbyists will also find *B/Graph* to be of great use in a wide variety of applications.

B/Graph allows the creation of numerous types of graphs and charts including line graphs, point graphs, area graphs, bar charts, segmented bar charts and pie charts. You can also save both your data and your graphs.

B/Graph also provides statistical and analytical tools for the evaluation of data.

C



Easy Script is Easy

Commodore's
own word processor
for the Commodore 64
is a unique and powerful
product. Here's a look
at *Easy Script* from a
beginner's point of view.

By Bonnie Paris

When I first got my Commodore 64, I had never used a computer before. Everything was confusing and I couldn't understand the basic BASIC book. I was a complete novice. It seemed like another world until I got *Easy Script*.

Easy Script is Commodore's own word processor for the Commodore 64 and is by far the easiest for a neophyte to learn.

Once you boot up the system, you are in business. Next you've got to tell the system what it is that you want to do.

Let's say you are writing a letter that you want to save to show that you have written it. OK, here we go.

First we've got to name the manuscript or letter that we are writing. So we put:

F3 "Letter to XYZ" (RETURN)

Don't forget that (RETURN) or the computer will tell you about it.

Second you must tell the computer where to put the margins for your letter, what spacing to use and so forth. So let's enter:

F3 lm20:rm65:pl66:tl55:ju1:sp0(RETURN)

Now let's examine what we're telling the computer to do.

lm20: You are saying that you want your left margin set at 20.

rm65: That means that you want your right margin set at 65.

pl66: The normal page length of printer paper is 66 so that will probably remain constant.

tl55: This tells the computer that you want your text to only cover 55 lines of the total 66.

ju1: This command asks the computer to line up the right side as well as the left side. This is purely optional since some like it one way and others want it

the other.

sp0: That says to leave no spaces between lines... Or you might want this to be sp1 to have one space between lines if it is a short letter.

Now we want to tell the computer how many lines down from the top of the page we want to start so we say:

F3 VP6 (or six lines from the top of the page)

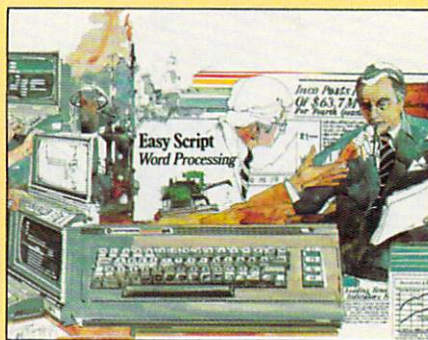
Then you can go on and type your letter as you wish. But another thing to remember is, unlike using a typewriter, you don't have to return until you come to the end of a paragraph in the body of the letter. Without worrying about returns, you can type twice as fast as you can on a typewriter.

Now let's say you made a mistake way up at the beginning of the letter. Use your cursor keys to take you back to the spot (SHIFT to go up and non-SHIFT to go down—SHIFT to go left and non-SHIFT to go right). Then type over the word or, if there isn't enough space, use [SHIFT/INSERT-DELETE] and ALAKAZAM! There's a space to type in what you want. If there's too much space and you want to close it up use the INSERT-DELETE without the SHIFT. Right in here I should explain that the computer will ask "Insert Line?". You push RUN/STOP and it will ask "Reset program?". Just push N for no.

OK so far. So now there's a whole line you want to put in or take out. Take your cursor up to the beginning of the line and hit F1 [SHIFT/INSERT-DELETE] and all of a sudden there's an extra line to type on and you haven't destroyed the line either. It's now just a line below. Or if you want to close the line up, use F1 INSERT-DELETE without the SHIFT. Easy isn't it?

So now you want to see what your letter looks like when you print it. Push F1 (that takes you out of the edit mode), then push O (output) and V (view).

By using your R-L cursor you can move the picture from side to



side. To move it down to see the rest, push the key which has the Commodore logo on it. If there is more than one page then push C and it will continue to the end.

So now we've written a letter. How about heading up a manuscript. OK. Here goes.

F3 "Name of Manuscript"
(RETURN)

F3 lm15:rm70-pl66:tl60:

ju1:sp1 (RETURN)

F3 vp3 (RETURN)

We know now what all that means but here's something different.

F3 cn1;F1 (SHIFT :)Chapter One F1 (SHIFT ;)F3 cn0 (RETURN)

Let's examine that. The cn1 and cn0 commands tell the computer to center the words Chapter One between the margins. The F1 (SHIFT :) and the F1 (SHIFT ;) tell it to make the letters twice their regular size. See, that's not so hard.

Now we want to tell the computer that we want a heading and page number on each page and have the pages numbered consecutively. So we give this command:

F3 hd3:Chapter One,,Page (F1 #)(RETURN)

F3 p#1(RETURN)

This tells the computer that you want "Chapter One" on the left side, the page number on the right side, the page numbering to start with page one and you want it three spaces from the top of the script. (Notice the use of two commas in the listing.)

Now suppose you want only a page number centered at the bottom of the page. OK, tell the

computer this instead:

F3 ft3:-(F1#) -(RETURN)

This tells the computer that on the bottom of each page you want the page number in the middle (don't forget those commas) with a dash on each side. One thing to remember... if you want the page number on the last page of the document, you'd better put the command at the bottom as well as at the top.

Now we want to be sure that the last page will come out looking like the rest of the pages so we use this command:

F3 fp0 (RETURN)

That tells the Commodore 64 that you want it to go completely to the end of the first page regardless of where the printing stopped.

Now let's say that you want to link this to "Chapter Two" so that printing will be easier. Here is the command that comes at the end of the first chapter:

F3 lk:Chapter Two(RETURN)

Now let's say that you want to indent a quotation or other matter. You have already specified that you want the document double spaced (sp1, remember?) and left margin at 15 (lm15) and right margin at 70 (rm70). You want to indent this quotation and make it single spaced. Here's the command:

F3 lm20:rm65:sp0 (RETURN). (Don't forget to put it back to the original spacing by the command of **F3 lm15:rm70:sp1 (RETURN)**)

Now that does the trick. But if you want to leave blank lines to set it off, remember to put a RETURN in that space.

If you want to use tabs for your document then use the command:

F1 T H (Horizontal) or V (Vertical)

"OK" you say, "but how do I use those tabs?" Good question. To activate the tabs, use the f7 key (straight for horizontal and shifted for vertical).

So now we're finished with "Chapter One" and we want to

save it on disk. First we have to format the disk so it will accept the content we want to store so we do this:

F4 n0:NAME OF BOOK,01 (RETURN)

This puts the computer in the disk mode and tells it that this is a new disk, what the name is and also that this is the first disk (01). It will then ask "Are You Sure?" and you can push "Y" for yes. It will then format the disk. You can take a few minutes to format it and then you return to the edit mode by pushing RUN/STOP and then give this command:

F1 F (for file)

It then asks for the name of the file so to save time you simply put:

F2 (RETURN)

"Chapter One" jumps out. Don't forget to press RETURN. Here is a good place to say that if you have a tab in your text, better put a + sign in the title... so it looks like this (remember it's got to be only 16 characters too):

File name:Chapter One +

Now that we have it filed, we will want to print it. First make sure the printer is stationed at the top of the paper and then give this command:

F1 O (output) P (print)

Say that after you read it, you remember something that you forgot to mention and you want to change a few things. Just load it (F1 L), then put in the name of the document and RETURN. Go ahead and edit it like you did before.

Another good thing to know is that if you get in a position that you don't know how to get out of just push RUN/STOP RESTORE. It puts you back to the beginning but it won't ruin the text that you already have in the computer.

There are a lot more things that you can do with *Easy Script* but this should put you on the right track and help you understand the manual better. Don't give up here. I learn something from it every day that I use it. It's easy with *Easy Script*.

C



Four Word Processors for the Commodore 64

Word processors for the Commodore 64 are in great demand. Here we look at four popular packages to help you make a decision.

By William L. Simon, Ph.D.

The problem in selecting a word processing package is somewhat like the problem in buying a horse: you first have to have some clear answers in your own mind about what you want to do with it. Some WP packages are great for the long haul, but are a handful when you just want to do a memo or one-page letter. Some, like an "honest" horse, provide "what you see is what you get."

If you're not already clear on what your needs are (and hardly anyone *is* clear), the comments on the word processing packages reviewed here should help you gain an awareness of some of the items that should be on your personal checkoff list in making a word processing selection.

The reviews here are intended for users with a Commodore 64 or other Commodore systems (where specified), one or two disk drives and a printer.

In case you're not already familiar with the sometimes mysterious

vocabulary of word processing, let's take a moment to explain a few terms. "Block functions" give you the capability of designating a section ("block") of text—from a few letters to a sentence, paragraph or more—to be moved to or copied at a different place in the document or deleted. A "header" is one or more lines that will appear at the top of every page of the text without your having to re-enter them each time; a "footer" is the same at the bottom of the page.

Except where noted, all the products reviewed here offer the basic capabilities common to all "full-featured" word processing packages. These include block functions (move, copy, delete), search and replace, headers/footers and automatic page numbering.

Our first package, unlike any of the others, is designed for use at home rather than in the office:

Product Name: *Bank Street*

Writer

Computer: Commodore 64
Authors: Messrs. Blum, Choat, Dublin, Harrington and Nilson, with Franklin E. Smith, and a design team of the Bank Street College of Education; manual by Robert Gula, Groton School
Manufacturer: Broderbund Software

Medium: Disk

Price: \$69.95

Where to buy: Write the manufacturer at 17 Paul Drive, San Rafael, CA 94903 to obtain the name of a dealer near you.

The cover art on the package shows a pair of beaming parents looking on as a little girl types at the keyboard—which is an accurate portrayal of the use that *Bank Street Writer* was designed for. Your kids will find it powerful, convenient and easy-to-use, and any youngster who learns to type well enough to do homework assignments on the computer will be pleased by the convenience of

correcting mistakes, centering titles and so forth.

The software has been designed to make it easy for the learner and the user. For example, the loading instructions are reproduced on the label of the disk — so you don't have to go thumbing through the manual, trying to find the right page. And the disk contains a tutorial to help children learn how to use the variety of commands available.

I was only able to get upper-case printout, although Broderbund assured me that the system does provide the usual upper and lower case; they seemed mystified that I couldn't get any small letters.

Bank Street offers a number of features in common with the larger packages (headers and footers, for example) and one that many major packages don't even have ("unerase," for recovering a line you've deleted in error and similar catastrophes). But some elements of the design make the system awkward to use. For example, if you notice a typo earlier in the line you're on, you can only get back to correct it by erasing all the text in between. And if you want to move the cursor around the screen, you have to leave Write mode and call up the Edit mode.

The user's manual is well organized and clearly written. It includes a quite brief but useful index which is combined with a glossary.

Product Name: *Cut and Paste*

Computer: Commodore 64

Authors: Messers. Mott, Hayes, Lane, Maynard, Morrison, Shaw and Silva; manual by David Grady

Manufacturer: Electronic Arts

Medium: Disk

Price: \$50.00

Where to buy: Write the manufacturer for the name of the nearest dealer: 2755 Campus Drive, San Mateo, CA 94403

You know that *Cut and Paste* has taken a fresh approach to the problem of word processing from the moment you see the package, which is not a box but a unique, flat triptych design with clever,

whimsical art and a sense of style. And as the package copy quickly makes clear, the software has been designed by people who have a well-developed philosophy about the subject, based on throwing out ideas left over from the typewriter and using the programmer's approach to text manipulation.

As just one example of what this means, you won't find a global search-and-replace function; too often, the C&P designers maintain, you decided to replace "fun" with "joy" throughout the text... and unknowingly ended up with the word "joydamental" or the like. (See why?)

On the other hand, *Cut and Paste* has been laid out so that it is easy to learn and easy to use, with commands designed so you can remember them readily. And a table of contents item titled "Taking Care of Poor Widows and Orphans" leads you to discover that the system automatically prevents the situation in which (for example) a section heading appears at the bottom of a page, separated from the text that follows it because the page-end happened to fall just at that point.

The software provides three printing formats — one for 8-1/2" x 11" paper, one for business envelopes and a third that you specify yourself.

The manual, a visual delight because it's so well designed, contains some gentle humor to ease the burden of learning and a "Command Summary Card" provides quick reference to the function commands which are mostly based on the use of the control key plus an appropriate alphabet letter ("C" for Cut, etc.). Unfortunately, no use is made of the Commodore function keys.

No printer configuration routine is required. That's because no special functions are supported. Translation: you can't do italics, underlining, boldface, etc., even if your printer is capable of it.

All in all, *Cut and Paste* is a pleasant program to use. If you can live with its limitations, it's

a product well worth your consideration.

PaperClip is one of the biggest sellers and one of the most powerful of packages for doing word processing on the Commodore 64 and other Commodore computers. If you have demanding word processing requirements (for business use, for a professional writer or for any other heavy-duty requirement), this is one program you should certainly consider.

80-Column Word Processing

Over the years I've evolved a very strong personal preference (prejudice?) about word processing and it's this: the ideal word processing package should be no more cumbersome to use than a typewriter and should let you see on screen exactly what you will get when you print out — a feature referred to as "what you see is what you get."

That's of course a problem on the Commodore 64, unless you're typing only memos on narrow paper. The 40-column format can't very well reveal how 80 columns of printout will look on the page.

The answer is to opt for an 80-column word processing package. For virtually any office or personal application where the word processing will be used much of the working day — as in my case — I consider 80-column software to be a great trouble-saver and all but a necessity.

One way to achieve this is by purchasing an 80-column board (ask your Commodore dealer) and *PaperClip*, a word processor from Batteries Included that was reviewed last issue — which is designed to support this approach. CAUTION: You should insist that your dealer demonstrate that the board and software are compatible before plunking down your money.

In addition, here are two of the other 80-column alternatives.

Product Name: *Word Manager*

Computer: Commodore 64

Author: Donald K. Nakano

Manufacturer: Data 20

Medium: Disk or cassette

Price: \$179.95 (includes 80-column board, spreadsheet and mailing list)

Where to buy: Can be purchased from Commodore dealers; or contact the manufacturer for the name of a local outlet: 23011 Moulton Parkway, #B-10, Laguna Hills, CA 92653.

This package is one that makes us want to stand up and cheer. Every other word processing package for the Commodore 64 we've ever seen requires you to memorize control codes for each action. Even the common things like centering, underlining or defining block markers have to be done with codes from a long list — and often with absolutely no connection between the function and the code that would help you remember (e.g., "Control" for turning on underlining).

Word Manager solves that by using the top row of keys for commanding these functions and provides you a card that sits neatly on the keyboard just above this row — so you can locate the correct key in an instant. Why every other manufacturer ignores such a simple and pleasing scheme is beyond reason. I get the impression that most software designers have never taken the trouble to consider what the *user* might want, or even (heaven forbid!) to ask some ordinary, typical users what their preferences are.

So the good news about *Word Manager* is *convenience*. The bad news is that, for the moment, the program will not do headers and footers, does not provide justification, has only limited blockmove capability and is limited to a maximum of five pages per document.

But even here there's good news ahead. The manufacturer advises us that an update was due out last summer which added more powerful printer configuring, headers/footers and justification. It also included a text-linking procedure so that documents longer than five pages can be entered in separate files but strung together

for printing.

As noted above, the price includes the required 80-column board, a spreadsheet program and a mailing list program. Purchasers of the current software will be given the opportunity of moving up to the new program for a nominal fee.

Finally, a product so unusual and special that it belongs in a separate category:

Product Name: *Super-Text*

Computer: Commodore 64 with 1541 disk drive

Author: (No credit given)

Manufacturer: Muse Software

Medium: Disk

Price: \$99.00

Where to buy: For the name of a local dealer, contact the company at 347 N. Charels Street, Baltimore, MD 21201.

What's so special? Just this — *Super-Text* is an 80-column software package that does not require any extra hardware! It achieves the 80-column display through the software so that you do not have to buy an 80-column board.

There's more than just the hardware cost involved here. Using an 80-column board for your word processing can prove something of a nuisance, since you may find that you have to remove the board every time you want to work on a spreadsheet, play a game or use some other type of program, then replace the board when you want to go back to word processing. *Super-Text* saves you the trouble.

The manufacturer recommends that you use a high-definition monitor with this software; otherwise you may find the characters hard to read. However, you're given the choice of operating in either 40- or 80-character mode and can shift back and forth at will, so you have the option of entering text in the larger and clearer 40-character setup, then going into 80 to check the layout on the page.

Configuration files are included on disk for the VIC-1525 and Epson, NEC and Okidata printers.

Apologies: we did not have sufficient time to put this package through its paces very extensively. The following are for the most part gleaned from the manual.

It's apparently necessary to exit from the text-writing mode into a different mode if you want to move the cursor to a different part of the document (for example, to correct an error in an earlier paragraph). As I mentioned earlier, I consider that an inconvenience and annoyance. Also, there appears to be no capability of doing mail-merge or column operations. And the routine for setting margins and tabs is clumsy.

Although the package could have been designed to show you only what will print out — letting the screen be as clean as a sheet of typing paper — the design instead loads the screen with control symbols... which some users like and others (including me) abhor.

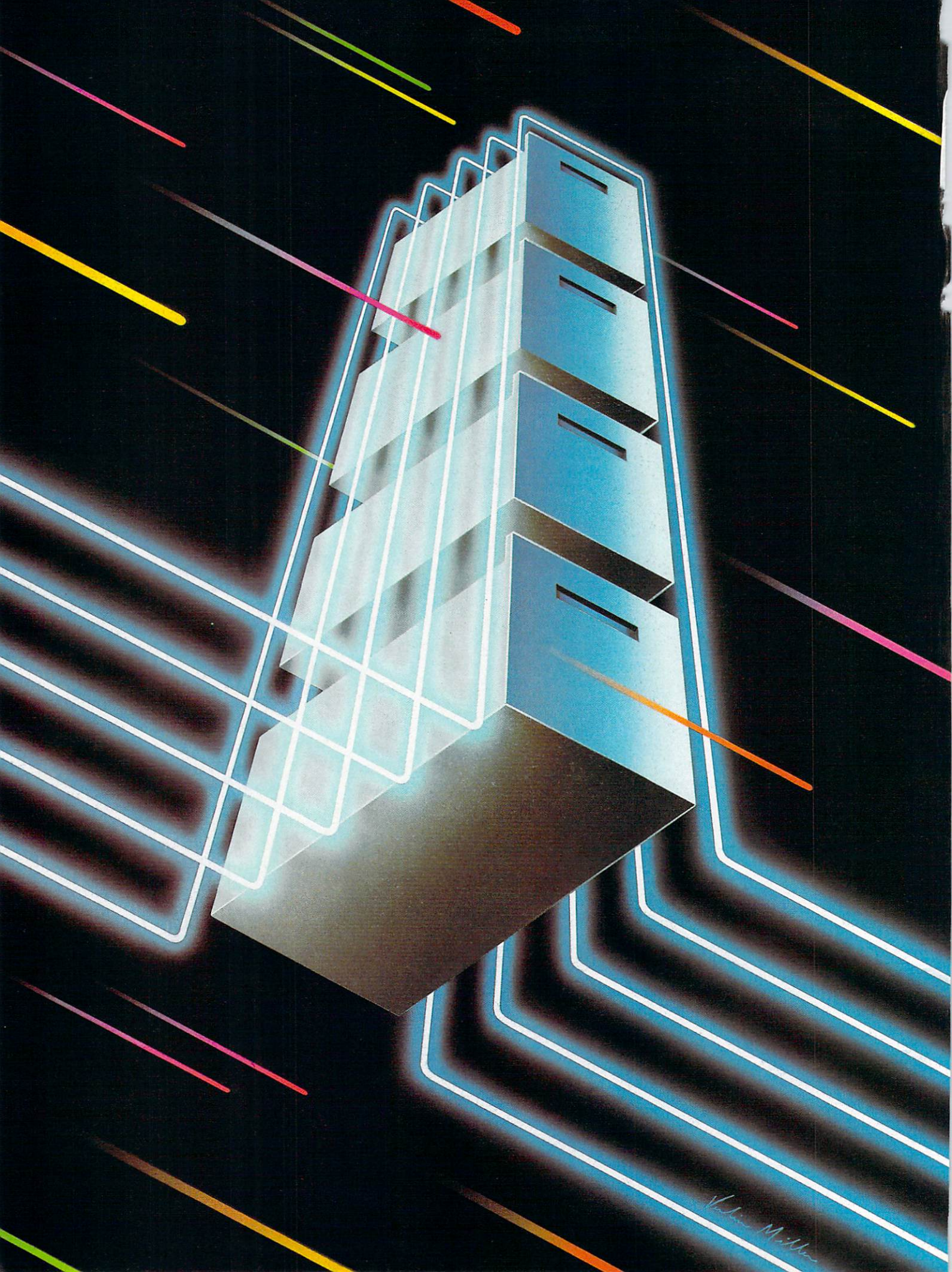
Unique among any of the other packages reviewed here, *Super-Text* provides an extremely handy split-screen feature that allows you to display two different parts of a file on screen at the same time.

If you're looking for a powerful word processor and share my view that the 80-column route is the only way to go, I'd recommend that you take a good look at *Super-Text* before making a decision. Its shortcomings may put you off... but on the other hand, its advantages may have you cheering.

C

William L. Simon has been a full-time freelance writer for 25 years. He has written over 500 documentary and business films and has also worked extensively on writing projects in the computer field. He holds a degree in electrical engineering and educational psychology and his doctorate is in communications.





Valerie Millman

11 DATABASES

Database programs store information (data) that can be selectively rearranged to generate answers, lists or reports. There are both general and specific database packages (such as for farm, medical, dental or law offices) on the market, along with mail lists, stock portfolio managers and reference aids.

By Jim Strasma

Editor, *Midnite Software Gazette*

What Databases Do

Data managers are electronic filing cabinets. Typically, they hold as much information as a 3" x 5" card box. Also typically, the information is divided into chunks about the size of one 3" x 5" card. The whole card box may be thought of as a file (the computer term for a full set of related information).

For instance, think of your Christmas card list as your file. Within the file, each card's-worth of information is called a record. It represents all available information about just one member of the set. That would be each different family in your Christmas card list. A subdivision of a record, called a field, holds one item of information about that one member of

the set, such as a person's zip code, the names of each child in the family or the last year you sent the family a Christmas card. Thus, each record is made up of one or more fields and each file is made up of one or more records.

What to Look for in a Database

The very best data managers now offered are called relational data managers because they can relate (handle several files at once) — as if you had several card boxes and could pull information from each as needed. Very few of the data managers currently available are able to juggle more than one file at a time.

Another important feature of the best data managers is that their field and record sizes are almost unlimited. Ordinary data managers have a field size limit of under 80 characters because that is the most data that can be typed into the computer's keyboard to answer the question asked by one BASIC statement. For example, in most database programs you can't type in a street address longer than 80 characters as one field. If you need more (like Office of Admissions, Rm. 12, School of Arts and Sciences, University of California at Berkeley), then you must break it down into two or three smaller fields. Ordinary data managers also limit each record (the total information for one entry on a Christmas list) to under

254 characters (the maximum size of one relative record on a CBM diskette). For many uses these limits are adequate, but it's nice to be able to go beyond them if necessary.

A third advantage of the best data managers is the ability to maintain multiple prime keys. In a card file box, each card is filed in a certain order — in a Christmas list, it might be alphabetically by last name. If you later decide to keep the list in order by zip code instead, you'll have to sort it all over again. Most data managers can do this on request but some of the best ones don't need to. Instead, they simultaneously maintain the list in several orders at once, allowing you to instantly look at the cards in any order you like. This is especially important when you would otherwise need to sort the file often, as in a mailing list. However, juggling the information in several ways at once does take time, so programs that allow for it usually take longer to add or delete a record than simpler programs.

Still another characteristic that often separates better from lesser data managers is their file type. All Commodore computers are equipped to handle all file types. Any limitation is in the storage device used — a cassette drive or disk drive, for instance. The simplest data handlers use sequential files. Usually this means all their information is in memory at once. In one respect this is good, because they can manipulate information very quickly, without waiting for a disk drive to find and load it one piece at a time.

Those using a cassette drive must use this type of data manager since cassettes use only sequential files. However, sequential-file data managers hold less information than other types, because they hold only as much data as can be stored in the computer at one time. For simple mail lists of under 100 names, a sequential-file database is probably adequate. For anything larger, however,

you will eventually have to use a disk drive — or preferably two disk drives — and a random or relative-file database, which I will discuss shortly.

Just for your information, sequential files are also used as an option on several of the best data managers/word processor combinations to pass information between themselves. In these cases, the sequential files are not a primary way of storing information, but a way of making the program vastly more flexible. In the reviews that follow, several data managers are noted as working with particular word processors, for example. Those databases noted as working with *PaperClip*, *Easy Script*, *Super Script* or *Word Pro* word processors are also compatible with the others, as well as with any other program able to read sequential files.

Many companies now use direct-access files, often called random files. Random files allow a data manager to fill an entire diskette with a single file of information and look at any record (or more precisely, any track and sector) within the file at any time. However, they are difficult to use well and vulnerable to hardware problems. A common disk command used to overcome such problems (validate) effectively erases random files from the diskette's map of used space. I am reluctant to recommend using random files, but must admit that some of the best programs do so with good results.

Relative files are similar to random files but are easier to use properly, at the cost of a bit of speed and flexibility. They make each record within a file (one family's "index card" within the Christmas list) the same size — usually 254 characters long. However, within that established length each piece of information (field), like street address or number of children, can be a different length from record to record.

You can easily search for a specific record (family name)

much faster using relative records than using sequential records. They are often more reliable than direct-access files and always easier to access from other programs (something you will eventually want to do).

The next feature to look for in a data handler is how it sets up files. The simplest and best way to set up files is with a full-screen forms editor. With one of these, you simply draw a picture of where you want information placed on the screen. Less flexible systems make you set names and lengths of fields without seeing how they look as you do it and worst of all, expect you to say in advance how many fields you will need and don't allow you to change your mind later.

Perhaps the most important feature in a data manager over the long haul is its ability to restructure a file. No matter how carefully you design a file, you will eventually wish to add, delete, move or change a field in some way. The best systems make this simple to do; most don't allow for it at all.

There are other useful features to look for. Speedy sorting and searching by various fields is one (as when you change an alphabetical Christmas card list into zip code order before actually printing the cards; or when you find everyone in the list that neither sent nor received a card last year). Flexible report formats that can print your information in any order and shape is another (best for this would be a built-in word processor; next best is the ability to send information to a separate word processor, although that takes enough time that built-in report and label abilities may be preferred). If you will need financial information from your files, math capabilities are a helpful part of most data managers. Also note that some data managers cannot even handle lower case letters and commas. Avoid them.

One other great blessing is programmability — the ability to automate commonly used se-

quences of commands. One way to do this is within the program. Another is by modifying a BASIC portion of the program as needed. Programs which prevent such changes tend to be less useful than others over the long run. However, programs written entirely in BASIC tend to be too slow for a data manager. (Remember — any data handler looks fast with only a couple of records. Before buying a data manager, test it with several hundred records.)

Less important are such features as passwords (often ineffective against capable programmers and unnecessary if you lock up sensitive information in a safe) and the ability to link several diskettes into a single file (such files are almost impossible to sort and often unreliable).

No one program has all the desirable features. A few, however, come close. Most are also quite affordable. Pay special attention to required equipment and compatibility with other programs you use (especially with your word processor). Surely one is right for you.

With all that in mind, the following pages contain updated reviews of some of the best data manager and mail list programs reviewed during the past four years in the *The Midnite Software Gazette*, an independent magazine specializing in reviews of products for Commodore's computers. They address various needs, but each is, in some way, excellent. Naturally, these are not all the programs the *Midnite* has reviewed. To cover all of them would take several more pages. Instead, those still widely available are listed after the other reviews, with a brief note as to why they were not reviewed in full. For details on the products reviewed in depth, refer to the chart on the next page.

Administrator II

According to our reviewer, who has used it for over two years, *The Administrator* is an excellent package. Though not a fully relational database like *Superbase* and

Silicon Office, it does as well or better for many common business purposes by relating two preset files — master records and transactions (ideal for a client who is automating customer service records).

Its features are much like those of other good database packages: a prime key, multilevel sorting, math calculations, searching and creating indexes, some reports (including mail labels and many kinds of subtotals) and the ability to store complex command requests for reuse (especially on the advanced hard disk version). Though it lacks the built-in word processor of *Silicon Office*, it can send sequential data to various word processors. Current versions allow simple formatting of printouts up to 132 columns wide and make restructuring fairly simple, along with editing and batch-processing transactions.

For me, the ultimate test is that the first time I saw the package, I was able to start and run it, create an application and do a sample printout for a client, without more than momentary references to the manual. Screen messages displayed nearly everything needed and the manual itself is a good, quick reference. In brief use, I found it to be a fine package.

The Consultant

When it first appeared, *The Consultant* (formerly *Delphi's Oracle*) destroyed two database limitations: it allowed more than 254 characters in a record and the *entire* program loaded into memory at once. This means you need the disk only to store your files and indexes!

This is a single-file data manager of extreme power. Though it lacks some of the options of the most expensive data managers, it also avoids their complexity. *The Consultant* combines simplicity with speed and gigantic records. Its records can also be kept sorted in several different ways at once. This means you can look up names in alphabetical order and then im-

mediately switch to printing out mailing labels in zip code order. (You can even request a list that is alphabetical by name within each zip code.) Because maintaining this order is complicated, do limit the number of sorts — with eight going at once in a large file, adding a name takes several minutes.

The Consultant provides easy mail labels and complex but completely flexible reports, two chores flunked by many data managers. If you need still more flexibility, *Consultant* information can be conveniently sent to most word processors. It also recognizes that needs change and makes it easy to change the structure of a file, revise the appearance of a form or convert from another data manager without typing everything in again. If you need to do calculations, current versions offer limited math (add, subtract, multiply and divide) but with only one intermediate variable. It even offers optional multilevel passwords to provide a bit of protection from prying eyes.

The Consultant is blessed with an excellent and well bound manual. There is also enough help within the program that skilled users will get by with only brief glances at it. New users should plan on three four-hour sessions. The program itself is menu-driven and virtually impossible to crash, but lacks any HELP screens.

The only serious problem we encountered is that after entering about 1,500 records, we ran out of room to hold all of the keys in memory at once and had to use the included Supersort option to order them thereafter. This is a bit of a pain. But unless you have huge numbers of records you won't encounter it.

Unless your information needs are truly unusual, *The Consultant* can handle them. Recommended.

Practifile

At first glance, *Practifile* (formerly *Flex-File*) is just another mostly BASIC file manager. It lacks many desirable features and its

speed has been variously described by our reviewers as blindingly fast and far too slow. Even so, *Practifile* is an important database. The reason is expressed in its former name — its great flexibility. To that we would add “durability”; it was, years ago, the first reliable database sold for Commodore computers.

This versatile database is among the very few to successfully use random files. The author chose

them in order to provide fast access to information on any part of any Commodore disk drive. *Practifile* also allows you to alter the shape of its records or even the program itself. Tips for adding your own routines to *Practifile* are included in the easy-to-follow spiral-bound manual. For instance, if you shorten the number of characters in each record (name) to less than 127, *Practifile* can hold up to 1000 names on a 4040 or

1541 disk. The report writer is fairly usable but no better than the best competitors'. The same is true of the sorting and searching options.

One recent review reports *Practifile* was never meant for a single drive, especially not one as slow as a 1541. It usually takes a minimum of six swaps to do anything and has twice so far tried to load something called “Disk File” which is not in the directory. It

Title	Publisher	Computer	Drive	Printer	File Type	Related Files	Prime Keys	Field Size (characters)	Fields	Record Size (characters)	Records	Screens Per Record	Works With	Remarks
Administrator II	Professional Software 51 Fremont St. Needham, MA 02194 617-444-5224	CBM	8050 or larger	CBM ASCII	Random	2	1	78	60	508	9000	1	WordPro	• two file database • compiled DTL BASIC • cassette port dongle
The Consultant	Batteries Included 71 McCaul St. Toronto ONT Canada M5T 2X1 416-596-1405	CBM PET 64	CBM	CBM ASCII	Relative	1	99	1755	99	12500 on 64 9000 on PET, CBM	Limited only by disk size	9	PaperClip	• database • machine language • 64 dongle in joy port 1 • PET/CBM ROM at \$9000
Practifile	Computer Software Ass. 44 Oak St. Newton Upper Falls, MA 02164 617-527-7510	All Models (24K added memory on VIC)	CBM	CBM ASCII (optional)	Random	1	1	79	20	254	1000 half-size on 1541 2800 on 8050	1	Pagemate WordPro	• database • BASIC machine language • cassette port dongle
The Mail Disk	Midnite Software 1238 Richland Ave. Lincoln, IL 62656 217-732-2703	CBM PET 64	CBM	CBM ASCII	Relative	1	1	32	10	150	1000	1	PaperClip Easy Script	• mail list • BASIC & machine language • unprotected
Mail Now	Cardco 313 Mathewson Wichita, KS 67214 316-267-6525	64	1541	Serial Bus	Random	1	1	120	8	254	600	1	Write Now	• mail list • FORTH • DOS protected
The Manager	Commodore 1200 Wilson Drive West Chester, PA 19380 215-431-9100	CBM 64	CBM dual 1541	CBM	Relative	1	16	40 on 64 80 on CBM	250	1500 on 64 252 on CBM	2000 small on 1541 4000 on 8250	20 on 64 2 on CBM	Easy Script Super Script	• database • BASIC & machine language • DOS protected • cassette port dongle on CBM
Mail Pro 64	Pro-Line Software 755 Queensway E Unit 8 Mississauga, ONT Canada L4Y 4C5 416-273-6350	64	1541	CBM ASCII	Relative	1	20	99	20	254	4000 small on 1541	1	WordPro	• mail list • machine language • DOS protected • backup available
MDM Database Manager	Mirage Concepts 2519 W. Shaw #106 Fresno, CA 93711 209-227-8369	64	1541 2031	Serial Bus (optional)	Relative	1	1	250	200	2000	65535	2-way scrolling	Mirage Professional Word Processor	• database • machine language • DOS protected • backup available
Silicon Office	Computer Marketing Service 26 Springdale Rd. Cherry Hill, NJ 10128 609-424-5055	CBM 8096	8050 8250 D9060 D9090 (optional)	CBM ASCII (optional)	Relative	6	1	78	200	254	limited only by disk size	1	self-contained	• integrated system • machine language • DOS protected • backup included
Superbase	Precision Software 820 2nd Ave. Suite 1100 New York, NY 10017 212-490-1825	B-128 CBM 8096 64	1541 8050	CBM ASCII (optional)	Random	15	1	255	127	1108	limited only by disk size	4	Easy Script Super Script	• regional data manager • machine language • DOS protected • backup included
Super Office	Precision Software 820 2nd Ave. Suite 1100 New York, NY 10017 212-490-1825	B-128 CBM 8096	8050	CBM ASCII (optional)	Random	15	1	255	127	1108	limited only by disk size	4	self-contained	• integrated system • machine language • DOS protected • backup included
TOTL Label 2.1 (VIC) TOTL Label 2.6	TOTL Software P.O. Box 4742 Walnut Creek, CA 94596	64 VIC (16K added memory)	Datassette CBM (optional)	CBM RS232 (optional)	Sequential	1	1	30	4	253	200 on 64	1	TOTL Text	• mail list • BASIC & machine language • unprotected

keeps on returning "File Not Found" messages. If you try STOP, you can't start again because of "File Not Opened" messages.

Still, as the only database that works unchanged on every Commodore machine from the VIC to the 8096, *Practifile* is a valuable program. It is also, without a doubt, the best data manager available for the VIC. Many user groups use it for their important records and find it quite satisfactory. Though it isn't state of the art, there is a lot to be said for a program that works well every time, and with recent price cuts, it is a bargain again. Its fans consider it worth its weight in gold. Recommended, especially for VIC owners.

The Mail Disk

In this "shareware" mail list for all Commodore computers, you can store, edit and print up to 1000 records of mailing and other information per diskette. Each record holds the standard information found on any mail list program: name, (name of business or institution), street address, city, state and zip. It also adds two phone numbers and up to 32 different categories in which to store special database information.

The Mail Disk has many nice features. For instance, one may code each record according to categories and later print only the records that match the chosen categories. There are many printing options such as index cards or one-, two- or three-wide mail labels, printing in alphabetical or zip code order and printing anything from short mail information to a full record. The diskette is full of instructions and documentation of the program principles, especially of relative records.

Unfortunately, *The Mail Disk* is a little slow accessing more than a couple of hundred records. You may also occasionally fall out of the program (but it is easy to get back in). Sometimes strange records occur which cannot be deleted.

The Mail Disk is a very powerful, flexible and convenient package. A real bargain. (Reviewed by Brent Anderson.)

Mail Now

Should meet the requirements of anyone who needs a simple address program. Provides a two-character data entry for "Category" and a 14-character "Remark" entry. The various functions are quite adequate and easy to follow. Original label formats are available in an excellent print section, which has more options than you may need. The writers may want to modify the "Delete" function to avoid deleting addresses prematurely or accidentally. Even with the preliminary manual, the screened instructions would make it possible to use this program with a little experimentation. Our reviewer gave this program good marks.

The Manager

This file manager has been popular on the CBM for three years and is a *good* package. For users who need only one file at a time, it is also a bargain, especially for 64 owners.

Advantages: Uses standard relative files, with nearly every desirable convenience for working with them included—sorts, searches, reports, screen dumps, dumps to word processors, etc. Has Commodore-recommended screen formatting, allowing you to easily design file formats. Includes somewhat programmable arithmetic functions. Display variables are recalculated each time the record appears, to conserve diskette space. Its other key advantage is its user-accessible BASIC and machine language code which allows the user to make custom changes.

Shortcomings: Commodore suggests users and dealers develop custom applications. Unfortunately, none of the SYS calls and parameters are documented. Our reviewer of the 64 version called the manual "the worst collection of gibberish I've ever encountered",

but later praised added documentation sent him by Commodore, "*The Manager* is a very capable program indeed; fully documented, it might even be fun to use."

Other lacks include any way to restructure a file of more than 20 fields, prevent duplicate records or find newly entered data without time-consuming key updates.

Despite such minor troubles, we keep a 4,000-name mail list on the CBM version at Lincoln College (where I teach) and have had no trouble with it at all—making *The Manager* the only program we've used without a hitch on files of this size. Recommended.

MailPro

Due to its batch entry ability and being in memory all at once, *MailPro* makes more efficient use of operator time than any other data manager we've reviewed. Those familiar with Steve Punter's *WordPro* programs will have little trouble using *MailPro*. (Others will be lost in space—the manual is hopeless and there are no helps or prompts.) Information is laid out using a variation of Commodore's screen input editor, but with little control over the location of fields. Eighty-column fields are possible on the 64, but only via horizontal scrolling and the screen looks messy compared to the 80-column version.

Any number of fields may be defined as prime keys, allowing very rapid reference and printouts in zip code or other orders. When sorting, the program considers upper and lower case as the same, thus avoiding separating otherwise identical entries. Unfortunately, duplicate entries are allowed and not reported. On the other hand, it easily accepts data from other programs and restructures its own formats without retyping and also allows default (automatic) contents for each line in the label. Once data is entered, finding it again is quick and easy, as is copying it to a printer.

Mail labels may be up to 23

lines long and 160 columns wide. Within those limits, the labels may be set up with all the precision of a word processor and the resulting print formats saved for reuse later. Any part of a mail list may be printed.

MailPro is very fast and easy to use for simple but large applications like subscription lists that don't need the full screen formatting, math and huge records of full data managers. Unfortunately, after entering 1100 records, our CBM version began inventing spurious extra copies of some records. Pro-Line was very helpful in salvaging the data, but has thus far been unable to isolate the problem. Short of such high limits, *Mail Pro* works extremely well. Recommended.

MDM Database Manager

MDM includes many of the features we recommend in a data manager, such as flexible arrangement of fields, sorts on any combination of fields, built-in math, ability to select records with common contents in a selected field, easy updates of multiple records and huge size limits. Forms, for instance, may be up to 60 lines long, allowing you to design something that would fill a normal sheet of paper. There is also a built-in label maker, flexible enough for Canadian postal codes and nine-digit zip codes. The manual is excellent, as are the on-screen helps. A hundred major software houses should buy it just to see a good manual!

As for problems, any disk error during the creation of a form means starting over. Since the program reduces disk error messages to a number, it may take awhile to figure out what caused the error. Although you can reuse a form or data in a new database, we weren't able to modify existing forms even slightly. We strongly wish the cursor up and down keys were usable for moving between fields, as they're in most other products we've looked at.

Although *MDM* is intended to

work with the C64-Link IEEE-488 interface (when relocated to \$C000), it does *not* work properly with the Commodore 4040 dual disk drive, nor with a serial bus printer plugged in along with the C64-Link. It does, however, work well with the normal 1541 disk drive plus serial bus printer. The only other problem we noticed is that we were unable to persuade it to leave a zip code at the left end of a field.

Sorts are rapid but not extremely fast. With 57 records, both a zip code sort and an alpha sort required 22 seconds.

Even though we had some problems with this new program, it is powerful enough to merit consideration alongside the best single-file data handlers for the 64.

Silicon Office

Silicon Office combines a database language, relational data files and a good word processor in a single program. Several independently defined files may be defined and related in nearly any way with it. However, *Silicon Office's* real power is that all its options are completely integrated.

As a true database *language*, it includes many of the expected amenities: numeric and string variables or expressions, parentheses, arithmetic, comparisons, subsorts, high-speed wild card searches, IF-THEN, GOTO, built-in functions (notably a calendar) and the ability to work in both immediate and programmed modes. However, it lacks PRINT AT, MID\$ and GOSUB!

As a word processor it has true multicolumn printing, links 120-150 page documents in a single file, evaluates complex expressions at print time and adds in data from any current file. Text is continuously formatted with word wrap and horizontal scrolling on wide documents. Text is also justified even within words. However, abandoned files are not erased and must periodically be cleaned up from outside *Silicon Office*.

Silicon Office comes with an

easily understood training manual plus a very complete, durable and well organized reference manual. The program itself includes several help screens, with cross references to the manual. A diskette of sample screen masks is also available.

The chief advantage of the more costly hard disk version is its ability to have a single file up to the capacity of the hard disk *and* back the whole thing up on 8050 diskettes. It's also nice to be able to have 30 files instead of six and to have data and work files on the same drive. It also allows the user to scratch data files from within the program and send special characters to printers.

My main complaint is that data printouts are slower than molasses flowing uphill. A simple mail label run of 1,500 names takes 14 hours. *Silicon Office* lacks one other desirable feature: the ability to refer to field names as array variables. This makes it almost impossible to design a way for an unskilled user to update only one of a large number of similar fields.

If you could have only one program, *Silicon Office* is still in the running, especially if you write multicolumn documents.

Superbase

Superbase is easily the most sophisticated database currently available for the 64 and B-128 and among the very best for the CBM 8096 as well. It excels in handling and relating data from multiple files and also includes a true database language that contains nearly all the important commands of BASIC itself. With it you can write your own programs and even complete application systems able to run on their own without intervention by their users. (Up to 4K long on the 64 and 8K on the 8096.) Like the best competing programs, *Superbase* allows full screen formatting of data, has completely flexible report formats and easily sends its data to popular word processors. It also makes restructuring simpler than any other

data manager we've tested. B-128 owners will also find it makes good use of the function keys to reduce typing.

The documentation is excellent, although learning to use such a powerful program inevitably takes a good deal of time. On the other hand, onscreen menus and numerous help screens make getting started fairly simple. Later you can add your own help screens and

More Databases

The following currently available products were also reviewed in the *Midnite Software Gazette*, but were not rated as highly as the attached programs.

64 Mail List for 64, from DES.
Data Manager for VIC or 64, from MicroSpec.
Filing Assistant for 64, from Rainbow.
Infodisk for 64, from Beaver.
Infomast for 64, from Rabbit.
Infopro for CBM, from Professional.
IRMA for CBM, from Commodore.
JINSAM for CBM, from Mini Microsystems.
Mail Mate for 64, from Commodore.
M'File for 64, from Double E.
Microbase for VIC+8K or 64, from Daedalus Digital.
The Name Machine for 64, from Commodore.
TOTL Infomaster for 64, from TOTL.

A few other products were also excluded, in spite of excellent reviews, because they are intended for special purposes. These include:
ASERT for CBM, from CFI. (Primarily for employment agencies.)
EQUIP for PET/CBM or 64, from The Codeworks. (Primarily for home inventories.)
Master for CBM and 64, from Abacus. (Primarily a programmer's aid.)
OOZ for CBM, from Commodore. (Primarily for searching through data.)
Research Assistant for VIC or 64, from TOTL. (Primarily for research.)

other memos to yourself.

The only limitations that will likely trouble you are the limitation of one prime key (shared by all current programs offering multiple files) and its inability to work with any disk drive other than the one for which it was purchased (due to its DOS protection). But this will only be troublesome to 1541 owners with access to larger disks. Area dealers report it has become their best-selling data manager and praise for it seems universal. Highly recommended for 64 owners and others who don't need the added features of *Super Office*.

Super Office

This is the only integrated system I've tested besides *Silicon Office* and it appears to be vastly better than its renowned competitor. *Super Office* combines all of the power of *Superbase*, *Super Script II* and *Super Spell* in a unified whole. Since each of these is among the very best available programs in their respective fields, having them together and able to use each others' data automatically is a huge advantage over all competitors. That it is also among the very first commercial programs to work with the new B-128 model makes it all the more attractive.

For information about file handling in *Super Office*, see the review for *SuperBase*. To this, add all the features of *Super Script*, plus word wrap (no broken words at line ends) and *Super Spell's* 30,000 (expandable) word dictionary. As in *Silicon Office*, the word processor can pull in any data from any active file anywhere in a document, giving extreme flexibility and ease in planning report formats and bulk mailings. However, unlike *Silicon Office*, all this happens quickly. Although the spelling checker is not available simultaneously with the data manager, it is loaded together with the word processor, thus easing the process of checking a finished document.

The price of *Super Office* is

far less than that of any competing program and the program comes from a very reputable company. New as it is, I love it. Highly recommended.

TOTL.Label

TOTL.Label is a good mail list program for small lists. The 64 version is very much like the VIC version, but slightly improved. For instance, the VIC version can print labels one or two across. The 64 version can also print labels three across and in report format.

When selecting which labels to print from the whole file, you can select just one label, only those added or changed or the entire label, only those added or changed or the entire file. There are no further categorizations. Its format is limited and preset, but you may sort labels alphabetically or numerically, on any field. You can also suppress the printing of one line of info.

The instructions are quite helpful and easy to understand. The company responds quickly to problems and cares about users. Evidence of this arrived just as our reviewer finished—a new version of the program at no charge, with better sorting and searching features, added disk-handling commands and the ability to use two disk units. Since the program is in BASIC and not protected, it has also proven easy to change for special needs.

With new products appearing almost daily, it is inevitable that some worthy products will have been omitted. For example, *Home File Write* and *Code Writer* are currently being reviewed, as is *The Last One*. Unlike the data handlers reviewed here, these programs generate BASIC file-handling programs for you. For more information on these and other new products as they appear, you may wish to read the reviews in *The Midnite Software Gazette* regularly. For a sample issue, send a postcard to: *The Midnite Software Gazette*, 635 Maple, Mt. Zion, IL 62549. C

Spreadsheets:

3f

c1



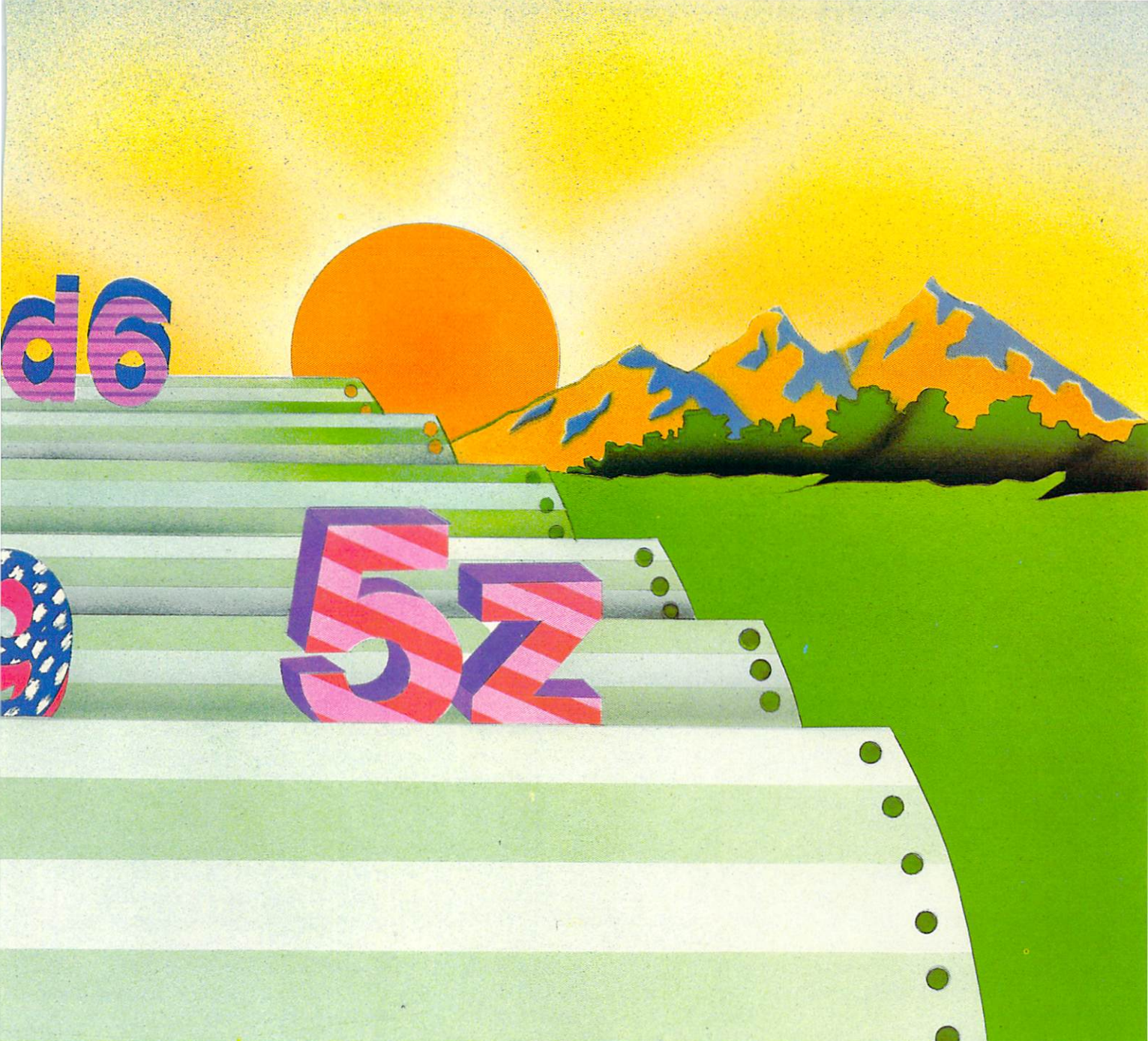
Number Processing With Multiplan & Practicalc

By Betsy Byrne & Richard Kotomori, MD

**Two excellent spreadsheets
for the Commodore 64 represent
the high and low end of what's available.**

Everybody *knows* computers are terrific at math, right? The same "everybody" (usually a friend, relative, co-worker or authors of magazine articles) told you that with a personal computer you would be able to computer *everything* — household budgets, paper routes, stock and bond features, rental property income and expenses or a teacher's gradebook.

Another little thing that you



ILLUSTRATOR—CARMEN CONSOLE

may have heard “everybody” mention at least once or twice is that computers are famous for projecting “what if” simulations, allowing users to make mathematical models to predict the outcome of just about anything that a human can devise a formula to encompass. “Everybody” is sure to have seen the outcome of an election predicted, or has, himself, computed the probable average temperature in Truth Or Consequences, New Mexico, in September of 1985.

But when the computer arrived in *your* home (or office) you found that these powerful features didn’t come built in — you had to buy software to make them happen. And if you happened to be a political candidate teaching at the local university, with three kids working paper routes, an Amway business and a spouse who owns several rental properties, you found that the same good old “everybody” who touted the computer’s abilities in the first place,

sent you running off in six different directions to spend lots of money buying eight different programs to enable your computer to do all of the aforementioned things. After you got those software packages home, of course, you, your children and your spouse had to spend hours, days or weeks learning to operate them — before any of you could use the computer for the tasks you bought it for in the first place.

If this scenario sounds familiar

and you are nodding your head right now and thinking, "That sounds like *me* (us)," then *your* particular "everybody" forgot to tell you (or didn't know) about spreadsheet software. A spreadsheet is a program that can do all the jobs I have mentioned and more — many more.

Like your word processing and database software, you only have to buy a spreadsheet once and it will perform multiple tasks. Together with your word processor and database, a spreadsheet is one of the trinity of workhorse programs that no software library should be without, although it is probably the least used and most misunderstood of the three. Yet, it is absolutely necessary for business applications and can be indispensable at home and in the classroom.

Possibly the best known spreadsheet program is *Visicalc* from Visicorp. This program has been called "the most versatile piece of software ever written." *Visicalc* may have been the first, but *Multiplan* and the others were not far behind and may even have improved on *Visicalc* when it comes to ease of use.

Please don't stop reading this because you already know about these powerful tools. I am going to explain them by way of reviewing two of the best packages on the market (excluding the ones made by Commodore itself), *Multiplan* and *Practicalc*. I chose these two because they are good and because they represent the high road and the low road, money-wise. *Multiplan* lists for \$99.95, and is one of the best known products on *all* brands of computers — including IBM (and workalikes), Apple and Wang. *Practicalc*, \$39.95, was designed for Com-

modore machines, although it has now been translated for other brands.

Multiplan was written by the software giants, Microsoft, the people who designed the industry-standard version of BASIC. *Practicalc* was written by Computer Software Associates, Inc., a New England company whose name is familiar to many Commodore users.

Multiplan is capable of filling the needs of the largest corporation, or doing the simple (only by comparison) jobs that home users need a spreadsheet to perform. *Practicalc*, on the other hand, is just the thing for the paper routes and checkbook balancing, or the one thousand and one applications needed by a family on a tight budget. I use it myself for, among other things, keeping track of the expenses that I am supposed to itemize and turn in to my editor — phone calls, stamps, mileage, etcetera.

All very nice, you say, but how do the blamed things work? If I didn't spend a few words talking about how-to, I might be in danger of being categorized with the "everybody" I referred to at the start of this article. Those of you who already know a bit about spreadsheet terminology must bear with me while I tell the rest of the folks what's what with rows, columns, labels and cells.

Visualize a teacher's grade book — everyone probably took a peek at one of these when the teacher wasn't looking or may even have been called up to the desk (as I was) and told by their own equivalent of my Mrs. Weatherup: "Just *look* at all these zeros, Betsy! I will give you just one more chance to make up those math assignments before I call

your parents."


Across the top of the page, in spite of my knocking knees, I saw dates and abbreviations that corresponded to the assignments given that marking period, three of which I had missed. If Mrs. Weatherup had been using *Practicalc*, she might have told me that these were *labels* (alphanumeric text strings) dancing across the top *row* (horizontal line) of a *worksheet* (the entire page you are working on, only part of which appears on the 64's screen at any time if it is more than 40 characters across).

Along the left hand edge of the page were the names of the children in the class, listed vertically. Again, if my elementary school in East Rockwood, Michigan, had used a computer, I might have learned that the names (*labels*) were occupying *column* (vertical line) number one (I noticed Linda was handing in *all* of her assignments).

My name was the sixteenth on the list (spreadsheet coordinate *column* one, *row* 16). About halfway across the page were the offending zeros, three of them in a row (*row* 16, *column* 5, 6 and 7), looking red and ugly under Linda's 80, 82 and 70.

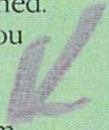
If Mrs. Weatherup's Commodore 64 had been up and running (an impossibility in 1959), she might have gone directly to those zeros by giving the program their *cell* (the individual square or entry) coordinates, *row* 16, *column* 5, etcetera, to change them to the 90, 95 and 100 I received on the papers I eventually turned in (better than Linda!).

If the gradebook had *really* been on the computer (as teacher John Cushman's is, whose printout is used in Examples 1 and 2), Mrs.



Weatherup could have set a formula in the last cell of each *row* that instructed the spreadsheet to average all my grades for the marking period and make the resulting grade appear in that cell (*row 16, column 15*, since there were 13 *cells* used for grades and one for my name) and as if by magic, a "98%" would have occupied that (oh so critical) spot. Her next step would have been to print out her grade information at the end of the marking period, sorted by highest average to lowest, even though she recorded them in alphabetical order (*then* my name would have been ahead of Linda's!). On *Practicalc* this would have taken only three keystrokes and a RETURN.

Put more concisely: a computer spreadsheet is simply a grid, or *worksheet*, onto which rows and columns of numbers or other information (labels) may be entered and on which common mathematical functions can be performed. Some of the functions that you can instruct a spreadsheet to perform are:

- 
- Sum, average, maximum and minimum of a range of numbers.
 - Counting the number of entries.
 - Sine and Cosine
 - Tangent and Cotangent
 - Determination of logarithm, exponents, absolutes, integer, square (roots).
 - Decimal formatting
 - Defined functions, i.e., adding column 3 to column 5, multiplying column 18 by .0468% sales tax, or anything your heart desires as long as you can devise a formula for it.
 - Printing up to 132 columns to your printer by activating

condensed mode.

- Printing graphs in high- or low-resolution depending on your printer and interface (if any).
- Sorting, both alphabetic and numeric.

These are a few of the things that both programs do, and that is without even scratching the surface. Pretty impressive — but how easy is it to learn how to *use* one? All those mathematical functions looked rather intimidating, and Mrs. Weatherup would be the first to tell you that I didn't enjoy doing my math homework. I didn't think it would be easy (I started with *Practicalc* almost a year ago) and it wasn't. But neither was growing up, learning to swim, having children or learning to use my word processor — all of which I wouldn't have missed for anything!

The best way to learn to operate a word processor, database or spreadsheet is to give the manual a once over, go through the tutorial (if it has one — both *Multiplan* and *Practicalc* do), then dig in and only worry about the commands that you have to use for the job at hand. The manuals will still be there if you have to do a form letter on your word processor, calculated fields on your database, or tangent or cotangent functions on your spreadsheet. I personally have never had to use *any* of these nifty features that are a part of my software's repertoire, but always feel very secure knowing that they are there if I need them.

It will probably take you, depending on your computer interaction skills and manual reading abilities, anywhere from several hours to several days to breeze through the fundamentals of *Practicalc* or *Multiplan*. How

long it will take to become proficient depends on too many random factors for even a spreadsheet to predict — but everyone I know who has stuck it out feels it was more than worth the time involved.

Let's talk about *Multiplan* for a minute. Marketed by HES for Microsoft, the news that it was available for the Commodore 64 caused more excitement than is usual when a software product is released. Possibly the most well known spreadsheet next to *Visicalc*, *Multiplan* didn't fail to take advantage of the special features of the 64. Although the earlier versions were not in color, the disk that I purchased to write this article (with copious notes and much advice from Dr. Richard Kotomori, who uses the package) came up in living color and allowed me to choose my own favorite color combinations to work with. If you are reading this and have a *Multiplan* disk that does *not* feature this option, you may send it back with the amount specified in the manual to receive an update.

So why was everyone so excited about another spreadsheet? Thousands of businessmen use *Multiplan* at their offices and many spend dollars they can ill afford to buy the same expensive PC that they use at work just so they can work on their files at home occasionally. The software for the PC is probably more expensive than for a 64 and of course no other computer could be as talented or versatile as the Commodore (prejudiced? ME?).

Now these folks can have their cake and eat it too, so to speak. With a Commodore 64, *Multiplan* and a modem, they can download *Multiplan* files from the office, save them on the 64 and work on

them at home! Of course if they are using 128K of memory for a specific worksheet, it won't come across too well, but most files transfer just fine.

Another nice thing about the Commodore version of *Multiplan* is that the whole thing is menu-driven, with extensive explanations available within the program. After a bit of experience with *Practicalc*, *Multiplan's* menus seemed self-explanatory to me at first glance. Of course I didn't try any tangents, but Dr. Kotomori and others assured me that all *Multiplan's* features are very

easy to use.

Another *Multiplan* feature that impressed me greatly is its ability to access files on disk to create another master file. A good way to illustrate this is with the example another *Multiplan*-using friend gave. He owns five rental properties, each of which he keeps records on. He needs to know how much money he is spending on repairs, taxes, utilities and his payments on the houses. He has to balance each one with the rent he receives from his tenants, his tax benefits and so on. At the end of his fiscal year, he must bring all

this information together into one worksheet, and *Multiplan* gives him the ability to do so. Most other spreadsheets available for the Commodore 64 do not.

Multiplan also allows the user to call information by name—to name a cell, not just use its worksheet coordinates. You could call your grand total field "George" or even "Grand total", and direct *Multiplan* to perform special calculations with it: e.g., add "Tax" (a named cell with the value of your local sales tax) to "George" (the grand total of all of George's sales). You can also call a named

Figure 1

Teacher John Cushman's *Practicalc* worksheet for his seventh-grade literature class. Working with a 4.0 scale, he as-

signs values to each type of assignment: e.g., book reports count as 25% of each student's grade (BRAVG-Book Report Average).

This example was printed out as entered: in alphabetical order, but with names deleted and only ID numbers showing.

ID	BR1	BR2	BR3	BRAVG	Q1	Q2	Q3	QAVG	T1	T2	T3	GLAVG	SSR	GPSS	BRGRGRADE
N	0	0	0	0	2.5	3	2.75	0	3	2.91	4.375	4	0	0	01.8375
453627	3.7	3.4	3.83	.6333	4	4	4	4	2.5	1.6	3.5	1.35	4	4	4.908333.2583
269211	3	3.8	3.93	.5666	4	4	4	4	3.5	3.1	3.51	.7666	4	4	4.891663.6583
419707	1.9	0	0.6333	3	2.5	4	43.0333	1.5	2.2	2.81	1.222	4	4	4	4.158332.2805
395596	1.9	2.1	01.3333	2.5	4	4	3.5	3	3.8	41.7166	4	4	4	4	4.33333 3.05
264843	0	2.7	0	.9	1	3.1AB	2.05	3.1AB	AB	1.2875	4	4	4	4	.2252.5125
319199	0	0	0	0AB	2.5	4	3.25	3	1.6	41.3083	4	0	0	0	01.7083
358556	0W	W	0	1W	W	1	1.5W	W	.625	4W	0	1.025	4	4	4.25833 1.9
285457	3.1	0	01.0333	2	2.5AB	2.25	.8	.8AB	.64166	4	4	4	4	4	.452.9166
295412	2.8	2.6	0	1.8	4	4	4	4	2.5	2.3	41.4666	4	4	4	1.416662.0888
306153	2.4	2.6	01.6666	1	2.5	3.52	.3333	2.8	1.6	31.1222	4	4	4	4	0.76666
313329	0	0	0	0	1AB	AB	1	.8	.4AB	.36666	4	0	0	0	01.6611
339108	0	0	0	0	1.5	0	21.1666	2.4	.4	2.66111	4	4	4	4	3.558332.9361
419715	2.4	3.4	.92	.2333	2	3	32.6666	3.3	3.2	31.5277	4	4	4	4	0.71666
82729	0	0	0	0	1	1AB	1	.1	.8AB	.31666	4	0	0	0	*ERROR*ERROR
296503	1.9	2	21.9666	4	3	43.6666	3.1	3.2	41.6611	4	4	4	4	4	3.491663.0027
314545	0	2.9	2.5	1.8	3?	1.5	2.25	.9	4	31.1916	4	4	4	4	.452.6416
82677	0	0	0	0	0	2.5	11.1666	2.8	1.8	3.3.96111	3	3	3	3	01.7111
370811	0	0	0	0	1	1.5	0.83333	.6AB	AB	.35833	4	4	4	4	01.3583
319167	3.9	3.8	3.85	1AB	AB	1	4AB	4	1.25	4	4	4	4	4	.96253.2125
272900	0	0	2.5.8333	2.5	4	4	3.5AB	1.6AB	1.275	4	4	4	4	4	4.208332.4833
419685	0	2.7	2.21.6333	4	3	43.6666	2.4	3	41.5111	4	4	4	4	4	2.408332.6194
381490	1.6	0	2.21.2666	2AB	2	2	2	1	2.83333	4	4	4	4	4	4.31666 2.15

cell from disk as discussed in the last paragraph.

Naturally, *Multiplan* has many more features that I have neither the need nor patience to explore right now, or the room to print. The *Multiplan* manual, after all, is 422 pages long excluding the index and there have been numerous books written about the package as well. The Commodore version does use the special function keys — it even gives you an overlay to remind you that F1 is "tab" and so on. If you are used to using it on another machine, the manual has a page full of the standard *Mul-*

tiplan commands and their Commodore equivalents — both of which will work — making sure that no Wang user need give up his control (key) to use *Multiplan* on the 64. *Multiplan* is compatible with *Omniwriter* (formerly *Busiwriter*) and *Omnifile* (formerly *Busifile*), giving its owner the power of a triad that interact and load each others' files.

What about *Practicalc*? Although most packages would suffer in comparison to *Multiplan*, I think that *Practicalc* holds its own admirably. After all, not everyone

needs all those features, and I have found *Practicalc* does everything that I need a spreadsheet to do easily and in a format familiar to a Commodore owner. It interacts with the *Practicalc* database from CSA and a version is available for the VIC 20 as well. I have always felt that the true test of any program is whether it will do what you want it to, and *Practicalc* has passed that test with flying colors. In fact, I am about to enter my purchase of *Multiplan* as a \$99.95 expense related to writing this article — on my familiar *Practicalc* worksheet. C

Figure 2

The same data as in Figure 1, using three keystrokes and a [RETURN] to have *Practicalc* sort the data from highest average to

the lowest. Note that John did not format his averages in decimal mode, since he was not working with money. If he had, his figures would have been rounded to two

decimal points. The error in line 18 resulted from a student receiving zeros for all assignments, according to John.

ID	BR1	BR2	BR3	BRAVG	Q1	Q2	Q3	QAVG	T1	T2	T3	GLAVG	SSR	GPSS	BRGRGRADE
269211	3	3.8	3.93	5.666	4	4	4	4	3.5	3.1	3.51	7.666	4	4	891663.6583
453627	3.7	3.4	3.83	6.333	4	4	4	4	2.5	1.6	3.5	1.35	4	4	908333.2583
319167	3.9	3.8	3.85		1AB	AB		1	4AB		4	1.25	4	4	96253.2125
395596	1.9	2.1	01.3333		2.5	4	4	3.5	3	3.8	41.7166		4	4	33333 3.05
296503	1.9	2	21.9666		4	3	43.6666		3.1	3.2	41.6611		4	4	3491663.0027
419715	2.4	3.4	.92.2333		2	3	32.6666		3.3	3.2	31.5277		4	4	3558332.9361
295412	2.8	2.6	0 1.8		4	4	4	4	2.5	2.3	41.4666		4	4	.452.9166
314545	0	2.9	2.5 1.8		3?		1.5 2.25		.9	4	31.1916		4	4	.452.6416
419685	0	2.7	2.21.6333		4	3	43.6666		2.4	3	41.5111		4	4	2.408332.6194
264843	0	2.7	0 .9		1	3.1AB	2.05	3.1AB	AB		1.2875		4	4	.2252.5125
272900	0	0	2.5.83333		2.5	4	4	3.5AB		1.6AB	1.275		4	4	2.08332.4833
419707	1.9	0	0.63333		2	3.1	43.0333		1.5	2.2	2.81.1222		4	4	4.158332.2805
381490	1.6	0	2.21.2666		2AB		2 2	2	2	1	2.83333		4	4	4.31666 2.15
306153	2.4	2.6	01.6666		1	2.5	3.52.3333		2.8	1.6	31.1222		4	4	1.416662.0888
285457	3.1	0	01.0333		2	2.5AB	2.25	.8	.8AB		.64166		4	4	4.25833 1.9
N	0	0	0 0		2.5	3	2.75		3	2.91.4375		4	0	0	01.8375
	0	0W	*ERROR		1	1	*ERRORAB		0W	*ERROR		2	0	0	*ERROR*ERROR
82677	0	0	0 0		0	2.5	11.1666		2.8	1.8	3.3.96111		3	3	01.7111
319199	0	0	0 0AB			2.5	4 3.25		3	1.6	41.3083		4	0	01.7083
339108	0	0	0 0		1.5	0	21.1666		2.4	.4	2.66111		4	4	01.6611
370811	0	0	0 0		1	1.5	0.83333		.6AB	AB	.35833		4	4	01.3583
358556	0W	W	0 0		1W	W	1	1.5W	W		.625		4W		0 1.025
313329	0	0	0 0		1AB	AB	1	.8	.4AB		.36666		4	0	0.76666
82729	0	0	0 0		1	1AB	1	.1	.8AB		.31666		4	0	0.71666
			0				0				0		0	0	0 0

Productivity Software for Commodore Computers

Data for this chart was supplied by .MENU, a database provided by the International Software Database Corporation. For further evaluative information and ordering, contact Bill Loudon, The International Database Corporation, 1520 South College Avenue, Fort Collins, CO 80524. The toll free number is 1-800-THE-MENU or 303-482-5000 (in Colorado or outside the U.S.).

Accounting

Name	Vendor	Computer	Subjects	Description
Purchase Ledger with Nominal Accounts	Anagram Systems	64 4016 4032 8032 8096	Commercial/Accounts Payable	A stand alone purchase ledger. Maintains a file open item supplier accounts. Invoices, payments and credit notes are posted to each account. Each invoice may be analyzed over six nominal headings (plus VAT). Maintains year-to-date and last years totals for each nominal account. Detailed reports include: invoice list, discounts available list, supplier statements, nominal account print (summary), nominal account print (detail), list of nominal transactions, payments list, debit note list, outstanding balances, invoices outstanding, supplier names and addresses.
Sales Ledger with Invoicing	Anagram Systems	64 4016 4032	Commercial/Accounting General Ledger	A stand-alone sales ledger and invoice printing package. Maintains a file of open item customer accounts and invoices, payments and credit notes to be posted to each account. Full financial details of each

Name	Vendor	Computer	Subjects	Description
		8032 8096		invoice are kept on file until the month end following payment. Invoice allows up to 20 lines per page and may be multi-page. Customer accounts may be grouped into sale areas for report printing. Trade and settlement discounts are catered for. Maintenance of comprehensive customer files. Detailed reports.
General Ledger	Commodore	64	Commercial/Accounting General Ledger	Customized chart of accounts, convenient entry of cash receipts, disbursements, general journal transactions. Interfaces with other accounting modules for automated posting of transactions. Maintains account balances monthly, quarterly, yearly, previous quarters and years.
Receivable/Billing	Commodore	64	Commercial/Accounts Receivable	Maintains customer masterfile, automatic billing with credit checking, item descriptions, unit pricing, extensions when interfaced. Flexible billing and unit price, automatically posts billing and ages open receivables by 30, 60, 90 day categories.
Accounts Payable/ Checkwriting	Commodore	64	Commercial/Accounts Payable	Maintains vendor master file, automatic aging of open invoices, automatic combination of invoices by vendor and prints checks with full remittance detail. Provides open item aging by 30, 60, 90 day categories. Interfaces with General Ledger.
Payroll	Commodore	64	Commercial/Accounting Payroll	Master record of each employee pay activity, calculates period pay amount including all tax and miscellaneous deductions, prints payroll checks with full pay deduction detail. Includes comprehensive management reporting including W2's and 941's. Will interface with General Ledger for automated postings.
Inventory Management	Commodore	64	Commercial/Accounting	Perpetual inventory records for all stock items. Processes stock receipts, stock issues, stock orders and stock adjustments with full audit trail. Optional interface for automatic billing of inventory items and automated stock on hand reduction. Capable of selectively calculating reorder level and economic order quantity by inventory category. Assists management in parts ordering by generating shortage and re-order reports.
The Home Accountant Plus	Continental Software	64	Commercial/Accounting Integrated Systems Personal/Finances Personal/Household Management	This is a complete personal/business accounting package which maintains as much as 200 budget categories. The program keeps track of up to five checkbooks and 2000 transactions per month. It can flag any transaction to be recalled for any use and performs a variety of accounting functions: monitors cash flow, checks, credit cards, assets, liabilities, income/ expenses and prints statements.
Accounts Payable/ Checkwriting Ver-1.3	Info-Designs Inc.	64	Commercial/Accounts Payable	This package keeps track of vendors and unpaid invoices and prints computerized checks with full remittance detail. ACCOUNTS PAYABLE/CHECKWRITING maintains vendor master file including vendor name, address, telephone number, year-to-date purchases and current balance for up to 150 vendors. It also provides automatic aging of open invoices and automatically combines invoices by vendor and prints checks with full remittance detail. Also provided is an open item aging report by 30, 60 and 90 day categories. Key reports include: Vendor Listing, Aged Open Invoice Listing, Closed Invoice Listing, Single Vendor Report Computerized Checks.
Accounts Receivable/ Billing Ver-1.4	Info-Designs Inc.	64	Commercial/Accounts Receivable	This package provides flexible billing of customers. Also included with the package is statement preparation. ACCOUNTS RECEIVABLE/BILLING maintains the customer master file including customer name, address, credit limit, year-to-date activity and current balance for up to 150 customers. It will automatically post billings to customer receivables record and automatically ages open receivables by 30, 60 and 90 day categories. Key reports include: Customer Listing, Aged Receivables Report, Customer Bills and Computerized Statements.
General Ledger Ver-1.4	Info-Designs Inc.	64	Commercial/Accounting General Ledger	This is a financial reporting system that produces customized income statements, balance sheet and special reports. This package provides a customized Chart-of-Accounts to meet specific reporting requirements. It also provides convenient entry of cash receipts and disbursements and general journal transactions. Maintains account balances for present month, quarter-to-date, year-to-date, previous quarters and previous year. It will also pinpoint profitable and non-profitable areas. Reports include: G/L Account Listing, Trial Balance, Income Statement, Balance Sheet and special reports.
Accounts Payable	Orbyte Software	64	Commercial/Accounts Payable	This program offers time-efficiency in keeping up-to-date records of creditor accounts. Features include: Capacity to hold up to 800 vendor accounts per disk with a per invoice maximum of \$99,999.99. Allows the user to design his own vendor file format including data on vendor name, account #, address,

Name	Vendor	Computer	Subjects	Description
				telephone #, date of account opening, amount due, billing date, invoice #, date of last payment, amount of last payment, interest incurred, current status, remarks and any other data the user designates. Enter all applicable invoice data including purchases, discounts, returns and payments. Addition, deletion and modification of any account or invoice data.
Accounts Receivable	Orbyte Software	64	Commercial/Accounts Receivable	ACCOUNTS RECEIVABLE provides an extensive series of information on clients' statistics, invoices, payments, adjustments and late fee. ACCOUNTS RECEIVABLE has the ability to hold up to 800 individual accounts per disk with 2400 active invoices also possible. Accounts are automatically aged by categories of Current Due, 30, 60 or 90 Days Due. The user can choose the system of filing that most fits his needs—either alphabetically or numerically by account number. This program allows the user to design the data to be included in the format of the Account Record, Invoice Record, Payment Record, Credit and Debit Memos and Late Fee Record. A variety of statements can be prepared automatically.
General Ledger	Orbyte Software	64	Commercial/Accounting General Ledger	GENERAL LEDGER compiles all data concerning financial management into a concise, comprehensive accounting record. GENERAL LEDGER can hold up to 600 individual accounts per disk, each with a maximum dollar value of \$9,999,999.99. The user may format these accounts to meet his specific needs. Debit and credit balancing is automatic. Account balances for month end, quarter end and year-to-date are established. A Chart of Accounts can be called up and provides detailed information on each account. Special comparisons and evaluations of current year vs. prior year are available instantly on demand. Reports include Close Out Statements, Trial Balances, Profit and Loss Statements.
Business Pac	Pacific Coast Software	64	Commercial/Accounting-General Ledger	This program utilizes a standard double entry. Will accurately manage your business finances with concise, accurate reports. BUSINESS PAC utilizes standard chart of accounts, step by step user friendly documentation with basic accounting review, incorporates automatic posting to any bank account, handles up to 99 distinct accounts, comprehensive enough to stand alone or to interface with A/P and A/R modules—which are soon to be released. Quick and easy transaction entry system, full compliment of month-end reports, video or printer review of all documents.
TOTL. Business	TOTL. Software	64 VIC	Commercial/Accounting-Integrated Systems	A set of straightforward accounting programs for the VIC 20 and Commodore 64. These integrated programs automate many of the time-consuming record-keeping tasks faced by the entrepreneur, salesman or service professional.
Business Pac 100	H & E Computronics Inc.	VIC PET	Commercial/Accounting-Integrated Systems Commercial/Integrated Business Systems	This program involves 100 ready to use business programs. It includes checkbook maintenance, payroll, accounts receivable, accounts payable, inventory control, stock calculations and 94 other programs. It also offers a 128 page users manual.
The Accountant	Micro Facilities Ltd.	4032	Commercial/Accounting-Integrated Systems	The Accountant is an integrated accounting system. This package incorporates a budget controller, a purchase controller and a sales controller. These programs can be bundled or can stand alone.
Cashbook	C & J Computers	PET	Commercial/Accounting-General Ledger	Designed for taking the hard work out of entering the cashbook and analyzing the figures etc. Two parts: 1. Entering daily weekly details with up to 20 separate headings and giving an instant printout of those entries, with check balance, forward totals. VAT portion of amount may be calculated or entered separately. Items are recorded and may be added to. 2. All items are grouped under each individual heading under which they were entered. Apart from file names for fields and data, items entered are: code, date, debit/credit, VAT option, cash, check or balance forward and amount.
Microledger	Compumax Associates	PET	Commercial/Accounting-General Ledger	General Ledger for small business. Matching revenues versus expenses in a classically simple fashion. Receives info from MICROPAY, MICROREC, MICROINV, and MICROPS. Maximum number of user-defined accounts is 867. Transactions per session 150—may be increased with larger memory size.
Micropay	Compumax Associates	PET	Commercial/Accounts Payable	Accounts Payable for small business. Aged trial balance of A/P, A/P by vendor or by date; prints checks. Also updates MICROLEDGER with A/P created and paid. Master file size limited only by disk capacity, 340 to 1,800 according to format.
Micropers	Compumax Associates	PET	Commercial/Job Costing Job Control Commercial/Payroll Commercial/Personnel Management	California payroll/personnel system for small business. Payroll register for salaried and hourly; prints paychecks, quarterly 9 amounts, W-2 forms, Job Cost report-labor, Personnel history. Updates MICROLEDGER with Payroll amounts, deductions. Master file size limited only by disk capacity, 340 to 1,800 according to format.

Name	Vendor	Computer	Subjects	Description
Microrec	Compumax Associates	PET	Commercial/Accounts Receivable	Accounts Receivable for small business. Updates MICROLEDGER with A/R created and customer and customer payments. Master file limited only by disk capacity, 340 to 1,800 according to format.
Checkwriter	Computer House Division	PET	Commercial/Accounts Payable	Prints check with two stubs. Asks date, first check number and bank balance once at beginning of the run. Prints payee name and address to show in window envelope. Prints payee stub with date, amount and up to four comments (to describe items or invoices being paid). Prints your stub with all above information plus payee name and remaining bank balance.
Versa Business	H & E Computronics Inc.	PET	Commercial/Accounting-Integrated Systems	This program is a coordinated accounting system with five separate modules which can be used individually or in any combination. These modules include: General Ledger, Accounts Receivable, Accounts Payable, Inventory and Payroll. Each module grows as you or your business grows, and comes with a professionally written manual, suitable for a first time computer user. Each module also includes a 30 day return policy.
Nominal Ledger Package Ver-3.1	HB Computers Ltd.	PET	Commercial/Accounting-General Ledger	A balance forward ledger system. This system is very easy to use with through validation of all input. Output includes audit trails, on screen inquiries and trail balance reports.
Sales Ledger Ver-3.1	HB Computers Ltd.	PET	Commercial/Accounts Receivable	A very easy to use balance forward sales accounting package.
Incomplete Record Accounting	SMA Microcomputers	PET	Commercial/Accounting-General Ledger	This package is designed by an accountant for accounting bookkeeping.
Nominal Ledger Accounts	SMA Microcomputers	PET	Commercial/Accounting-General Ledger	A suite designed to tie in with the present sales purchase ledgers.
Purchase Ledger	SMA Microcomputers	PET	Commercial/Accounts Payable	Open item or balance forward bookkeeping caters for 1400 suppliers as well as 3500 transactions. Full supplier details available including present balances and phone numbers. All information reviewable at any time, and will produce address labels automatically. Transaction files allows post invoices to file, post credit notes, post payments to file, and make cash adjustments as necessary.
Sales Ledger	SMA Microcomputers	PET	Commercial/Accounts Receivable	Open item or balance forward bookkeeping caters up to 1400 customers as well as 3500 transactions. Full customer details available including present balances and phone numbers. Information is reviewable at any time, and address labels are produced automatically. Transaction file allows you to post invoices to file, post credit notes, post payments to file, and make cash adjustments as necessary.
Irv I	Sosoft Ltd.	PET	Commercial/Accounting-Integrated Systems Professions/Industries/ CPA	Accounting records for the practicing accountant.
Budgets Within Nominal Ledgers	Thistle Computers	PET	Commercial/Accounting-Integrated Systems Commercial/Purchasing	This package includes: nominal ledger or combined nominal and purchase and sales ledgers. The facilities within any of the nominal ledger systems to allocate by account, a budget for the period and year-to-date. This can be done either by applying an annual budget and specifying the number of periods, or by a fixed amount against each of the periods.
Nominal Ledger	Thistle Computers	PET	Commercial/Accounting-General Ledger	This package features an account number, description, cumulative balance and period balance for each account. NOMINAL LEDGER also includes: posting journals (debits and credits) and the entry of details produces day book and automatically updates the accounts and control account. Reports—gives trial balance showing period and cumulative balances for each account, each cost centre and overall. Nominal Statement—gives at period end, or on demand, a report showing by account the brought forward balances on statements with details of each transaction making up this balance.
Purchase Ledger	Thistle Computers	PET	Commercial/Accounts Payable Commercial/Purchasing	This package provides full supplier details and postings (invoices, credit notes, discounts and cash). Reports generated are: Creditors List, Purchase Statement and Circulation (mail shot to all customers). There is also an 'open item' version that replaces the brought forward balances on statements with details of each transaction making up this balance. Capacity: 450 suppliers and 2000 transactions per period.

Name	Vendor	Computer	Subjects	Description
Sales Ledger	Thistle Computers	PET	Commercial/Accounts Receivable	This program is a complete general sales ledger. Customer details—account number, name and address, credit balances, turnover. Posting—invoices and credit notes, cash and discount, journals debit and credit. Reports—Statements automatically produced as period ends or on request. Debtors List, Circulation—an automatic option to produce labels for a mailshot to your customers. Also available—open item version replacing the brought forward balances with details of each transaction making up this balance. Capacity—450 customers using 2000 transactions per period.
Accounts Payable/Checkwriting Ver-5.1C	Info-Designs Inc.	8032	Commercial/Accounts Payable	This package keeps track of vendors and unpaid invoices and prints computerized checks with full remittance detail. This package maintains the vendor master file including the vendor name, address, telephone number, year-to-date purchases and current balance. It provides automatic aging of open invoices and combines invoices by vendor and will print checks with full remittance detail. It also features an open item aging report by 30, 60 and 90 day categories. Key reports include: Vendor Listing, Aged Open Invoice Listing, Closed Invoice Listing, Single Vendor Report and Computerized Checks.
Accounts Receivable/Billing Ver-5.1G	Info-Designs Inc.	8032	Commercial/Accounts Receivable Commercial/Invoicing/ Order Entry	This is a package that provides flexible billing of customers. It also includes statement preparation. This package will maintain the customer master file including customer name, address, credit limit, year-to-date activity and current balance for up to 750 customers. It provides automatic billing with credit checking, item descriptions, unit pricing and extensions when interfaced with Order Entry. It automatically ages open receivables by 30, 60 and 90 day categories. Key reports include: Customer Listing, Aged Receivables Report, Customer Bill and Computerized Statements.
General Ledger Ver-5.0G	Info-Designs Inc.	8032	Commercial/Accounting-General Ledger	This is a financial reporting system that produces customized income statements, balance sheet and special reports. This package will provide a customized chart-of-accounts to meet specific reporting requirements. It also provides a convenient entry of cash receipts, disbursements and general journal transactions. It will also maintain account balances for the present month, quarter-to-date, year-to-date, previous quarters and previous year. It also features departmental reporting and can pinpoint profitable and non-profitable areas. The reports include: General Ledger, Account Listings, Trial Balance, Balance Sheet, Income Statement and special reports.
Magis Plus	Management Accountability Group	8032	Commercial/Accounting-Integrated Systems	This is a real-time processing, fully integrated complete accounting system. MAGIS PLUS is a fully integrated accounting system for small businesses. It consists of a general ledger, accounts receivable, accounts payable, inventory, and is user friendly. It is presently being used in such businesses as sporting goods shops, florists, picture frame shops, floor covering stores, tire stores, farming operations, general merchandise stores and graphic art studios. This system is time tested. It will produce checks, W-2s, 941s, complete or partial employee listings and mailing labels.
G-Pac	Megapalm Ltd.	8032 8096	Commercial/Accounting-Integrated Systems	G-PAC is an integrated financial and cost-accounting package with 1500 personal accounts and 900 nominals. This modular package can include billing, stock control for continuous inventory recording, accounts receivable, accounts payable, nominal or general ledger, trial balance and periodic reporting of financial accounts. G-PAC is suitable for businesses with up to 30 cost centers, 1500 customer/supplier accounts and 900 nominals.
Accounts Payable	Software Corp.	8032 8096	Commercial/Accounts Payable	This software is designed to be used by any small business. This is a collection of programs to perform the following Accounts Payable capabilities: number of transactions—no limit, number of vendors—200 per diskette max., number of invoices—6500 per diskette max. or 2000 per vendor max. Any number of data diskettes. Checkwriterprint vendor checks, print deposit register and print check register. Summary reports include printed aged trial balance and printed vendor list.
Accounts Receivable	Software Corp.	8032 8096	Commercial/Accounts Receivable	This software is designed to be used by any small business. A collection of programs that performs automatic invoicing, reduces accounting time and expense, produces management reports and summaries. It also prints invoices, credit invoices, statements and deposit registers. Summary reports available for printing are: Aging Report, Customer List and Sales Report. The number of transactions per data disk—1500 (limit of 5 disks) and number of customers per data disk—200 (limit of 5 disks).
Job Estimate/Job Cost	Software Corp.	8032 8096	Commercial/Job Costing/ Control	A collection of job estimating and job costing programs for small businesses. This program allows the job estimator to generate and maintain the records required in the preparation of detailed estimates of various types. When used with the Accounts Payable program the item costs will be posted and accumulated as invoices are processed. Reports detailing both dollar and percentage variation may be prepared on demand.

Word Processing

Name	Vendor	Computer	Subjects	Description
PaperClip	Batteries Included	64	Commercial/Word Processing	PAPERCLIP has every standard word processor function and many exclusive features, including horizontal scrolling for charts. This program includes horizontal scrolling for wide reports (up to 250 columns), column moves, alphanumeric sorts and arithmetic. It works with 80 column cards and every popular printer, with instant printer set up. Featured is professional handling of form letters, mail list merge and large documents.
Easy Script	Commodore	64	Commercial/Word Processing	EASY SCRIPT has table producing capabilities, comprehensive printer controls, easy update facilities, easy document handling.
Wordcraft 80 Ver-4.14	Dataview Ltd	64 8032 8096 SuperPET	Commercial/Word Processing	WORDCRAFT turns your microcomputer into one of the world's most advanced word processing systems. The only Commodore-based multiuser word processing system with up to eight CBM 8032/8096 CPU's sharing one or more disk drives and printers. No extra hardware is required other than a cable. Text is stored on disk in chapter format with true proportional spacing. The screen displays the finished format of the document in the fixed spacing mode.
Insta-Writer Ver-1.0	Microsci Corporation	64	Commercial/Word Processing	A cartridge-based word processor which features 'instant-on' operation. Features include the standard functions of a typewriter plus automatic 'word wrap', margins, tab stops, centering, underlining and bold face print. Text may be moved or duplicated anywhere among four display pages (screens) and most editing requires only one key stroke and 'on/off' toggles facilitate operation. Up to 99 pages may be saved in a document.
Word Processor	Optimized Data Systems	64 VIC PET	Commercial/Word Processing	Provides document entry/edit/print/tape storage functions for general use. Upper/lower case provided. Adjustable left/right margins. Save and retrieve named tape files.
Word Controller	Orbyte Software	64	Commercial/Word Processing	This program provides all the features necessary to convert the Commodore 64 into a complete and powerful word processing system. WORD CONTROLLER allows full live-screen editing with complete cursor control. Total format control enables the user to specify a multitude of formatting techniques including margins, tabs, paragraph justification (left or right), text centering, columns and boundary markers. Word wrap is also available with this system. Page numbering can be automatically performed. Underlining is also included. Insertions, deletions and exchanges are all possible in single character, complete line, paragraph or entire block capacity. Global search and replace also.
Script 64	Pacific Coast Software	64	Commercial/Word Processing	SCRIPT 64 transforms your computer into a friendly yet sophisticated 40 column word processor for home or business. This was designed to allow powerful test-editing capabilities without long hours of orientation or training. SCRIPT 64 offers features such as moving text within/between screens, global search and replace, superscripts and subscripts, automatic structured formatting, dictionary/spelling checker, help screens, small and large screens control maps that can be saved, true insert and delete modes, will hold 999 screens of text, merging with a mail list, automatic hyphenation and word stream. It is compatible with most printers and prints through port to another computer.
WordPro 3 Plus/64	Professional Software Inc.	64	Commercial/Word Processing	WORDPRO 3 PLUS/64, written for the Commodore 64, is a commercial level word processor. Features include: Auto Page Numbering, Headers and Footers, Math Functions, Global Search and Replace, the Ability to Create Multiple Personalized Letters and Documents, Underlining, Boldface, Superscripts and Subscripts.
Homeword	Sierra On-Line Inc.	64	Commercial/Word Processing	This is a word processor program without the convoluted manual or complicated commands. The instruction booklet is short and easy to read. Small pictures in the program represent the many choices of writing and editing tools. They're the reason you don't have to wade through a thick manual.
TOTL. Text	TOTL. Software Inc.	64 VIC	Commercial/Word Processing	Turn your VIC 20 or Commodore 64 into a professional quality word processor when you use TOTL.TEXT with CHICKSPEED. Have the speed and versatility to produce simple or complex documents, forms and letters: from a memo to a thesis. There are three versions of TOTL.TEXT: 2.0 and 2.5 for VIC 20 and 2.6 for the Commodore 64.
TSI Editor	Type-Share	64 VIC 4032 8032	Commercial/Word Processing Professional/Industries Professional/Publishing	A menu drive, line oriented editor for the typesetting application. Type-Share is a service bureau allowing computer users to use their terminals as typesetting terminals. Through the manuals, one learns how to embed typesetting commands into text files. Those files are then transmit-

Name	Vendor	Computer	Subjects	Description
				ted over the telephone through CompuServe connection. The TSI Editor was written for the entire Commodore line of computers and was designed to be easy to use.
Wordform	Landsoft	4016 4032 8032 8096	Commercial/Word Processing	Features: Right and left centering, inserting text, moving text, search and replace strings, auto page breaks and auto numbering, auto load of text specified from previous text. Disk or cassette filing. Screen display equals print-out.
WordPro 3 Plus	Professional Software Inc.	4032	Commercial/Word Processing	WORDPRO 3 PLUS offers an exceptional text editing, document storage and typewriter quality printing capability to any business whose needs would benefit from the increased productivity inherent to word processing and printing feature considered important to sophisticated word processing. Included are: global search and replace, math functions, superscripts/subscripts and much more. Compared with other available systems, many of which cost up to twice as much as the system that WORDPRO 3 PLUS creates, it is unusually easy to learn and just as easy to operate.
Textcast II	Cognitive Products	PET	Commercial/Word Processing	A word processor for 8K and larger machines, old or new ROMs. All in machine language. Edit with tapes or disks in any combination. Produces ASCII files that can be used by other programs. Unfinished words at the end of a line leap to the next line while you type. Powerful screen editor with full control over visible cursor. Repeat action on all keys and commands. Use printer in typewriter mode. Prints files with centering, underlining, right justification, page numbers at top or bottom. Set left margin and line length. Transmits all NEC Spinwriter characters and commands.
Data Management System (DMS)	Compsoft Ltd.	PET	Commercial/Word Processing Systems/Compilers/ Interpreters Systems/Information Retrieval Systems	Information, storage and retrieval, sorts, numeric calculations, link to Word processing. Links to Wondercraft, Wordpro, and Wordstar. Over 400 systems have been sold to a wide selection of businesses, stock control/client records, etc.
PETword	Creative Software	PET	Commercial/Word Processing	Complete word processor capable of upper/lower case, string search margin setting, centering, text fill and justification and more. Complete PET word processor operates with either the CBM 20203 or 2023 printer. Capabilities include upper/lower case, string search and replace, margin setting, centering, automatic paging, text fill and justification, and many other features found on commercial word processors. Manual is available separately for \$5.00 and may be applied toward purchase of program.
Word Processor	Databank	PET	Commercial/Word Processing	Write paragraphs of text and then correct or process the text to the required line length. Store text on disk, load text from disk, use upper and lower case, use screen or printer etc.
Block Renumber	Supersoft	PET	Commercial/Word Processing	When you renumber a whole, your routines that you may have set in a block apart from the rest, are sandwiched up together. This program renumbers a block of lines so that you can keep them apart. You can also keep your subroutines separated from the rest of the program.
Large Letters	Supersoft	PET	Commercial/Word Processing	A routine for incorporation into your program for generating large letters onto the screen. Up to three, six letter words may be displayed at once.
The Executive	Dataview Ltd	8032 8096	Commercial/Word Processing Systems/Information Retrieval Systems	The Executive combines two well-known and proven programs: WORDCRAFT and THE MANAGER. The Executive is invaluable in all sorts of applications where there is an amount of data that has to be sorted, altered, deleted or expanded.
WordPro 4 Plus	Professional Software Inc.	8032	Commercial/Word Processing	This is a high powered word processing program. WORDPRO 4 PLUS, a state of the art word processor, is the best seller of all the word processors for the Commodore computer. In addition to all of the features in WORDPRO 3 PLUS, WORDPRO 4 PLUS incorporates simultaneous input/output, output to video, and the ability to begin printing from any page in a long document. WORDPRO 4 PLUS also has the ability to create multi-user systems. For all its sophistication, however, WORDPRO 4 PLUS is unusually easy to learn and just as easy to operate.
WordPro-ML	Professional Software Inc.	8032 8096	Commercial/Word Processing	WORDPRO-ML is a multi-lingual version of the WordPro 4 Plus word processing program designed for the Commodore 8000 series. WORDPRO-ML gives the user access to word processing in five languages (English, German, French, Spanish and Italian) with just a few easy key-strokes. The user can switch back and forth between languages without the loss of text in memory. The proper letters, symbols and accents in each of these languages will be displayed on the screen as well as appear in the printed text.

Database Management

Name	Vendor	Computer	Subjects	Description
The Consultant	Batteries Included	64	Systems/Database Management Systems	The CONSULTANT is a powerful information handling program that allows you to enter, retrieve and update data with speed. This program features large record size (over 8000 characters), up to 99 fields and nine display pages per record. It includes report writer and mail label printing. You can design your own forms on the screen or on printed reports. The CONSULTANT brings power and versatility usually found only in main-frame or minicomputer systems with provision for safeguarding accurate data entry and excellent flexibility in searching for records.
Power File	City Software	64	Systems/Database Management Systems	POWER FILE is a database manager and personal filing system that is easy enough to use at home yet powerful enough for offices. Use this program to organize your lists and records and create a personal filing system customized to your needs. POWER FILE will set up in electronic file in minutes, find any filed information in seconds. Custom reports will be printed out quickly and easily. It provides an easy merge of mail lists with form letters using a word processor. Included are ready to run applications and instructional sample files so you can get the most from your system from day one. You can call HELP line anytime and will receive free update lists automatically without returning the original disks.
The Manager	Commodore	64	Systems/Database Management Systems	THE MANAGER interfaces with word processing, accumulates totals on screen and creates subfiles. Sorts from any field.
Codewriter	Dynatech Microsoft	64 8032 8096	Systems/Database Management Systems Systems/Information Retrieval Systems	A plain English database design system that includes report and menu generators. CODEWRITER allows micro users with no knowledge of program coding to write professional quality application suites in a few hours. Similarly programmers can produce bug-free programs quickly. The generated code is in BASIC and is easily accessed and modified and generates comprehensive report programs.
C-BIMS: Cassette Based Information Management System	Windcrest Software Inc.	64 VIC PET	Systems/Database Management Systems	A unique databased management system that uses a cassette rather than the more expensive disk drive. The system allows powerful, highly flexible, user-defined management using only an upgrade ROM (BASIC 2 or BASIC 3) or BASIC 4 system with 16K and one cassette drive. Complete and ready to run cassette contains all programs and subroutines featured in C-BIMS: Cassette Based Information Management System for the PET (Tab Book No. 1489).
Mini Jini	Jini Micro-Systems Inc.	64 VIC	Commercial/Time Management Personal/Household Management Systems/Database Management Systems	MINI JINI is a record keeper for home, school, club or office. This program will hold 50-500 records on tape or disk. The books, addresses and other data that you record will be in order. You can track appointments, meetings and valuables with this system. Do checkbook, class or sports statistics with MINI JINI. You can make lists for letter writing software.
Insta-File Ver-1.0	Microsci Corporation	64	Systems/Database Management Systems	INSTA-FILE gives you the ability to design your own free form files using your TV screen as a visual "template" or model builder. All phases of creating, editing, modifying and deleting files are supported with complete cursor control. A maximum of 500 records per file, 62 fields per record and 30 characters per field can be implemented. Searching is supported by any field (string) using greater than, less than or equal to symbols. You may also "step through" (scroll) each file forward and reverse.
Comm-File	Orbyte Software	64	Systems/Database Management Systems	COMM-FILE, beyond the information management basis, extends to encompass even greater capabilities. It contains an unrestricted number of files each with unlimited fields and field length so that each may hold as little or as much data as needed. These fields can be used by business executives, retail and service business owners, educators, tradesmen, domestic engineers, club and organization officials, medical and legal professionals or anyone who needs to store any type of information. COMM-FILE also features an advanced concept in database management as it contains complete mathematical function abilities including addition, subtraction, multiplication, division and averages.
File Pac	Pacific Coast Software	64	Systems/Database Management Systems	FILE PAC allows the user to format File Input, Output and sorting of files. This program allows the user to format file input in the following ways: alphabetic or numeric field input, up to 15 fields in a record and up to 200 records in a file. FILE PAC allows the user to format file output in the fol-

Name	Vendor	Computer	Subjects	Description
				lowing ways video or printer, printed page layout, number of rows per page, number of fields per row. It allows sorting of files in the following ways: sequential listing of file contents, number sort and alphabetical sort.
Inquire Pac	Pacific Coast Software	64	Systems/Database Management Systems	This turns a Commodore 64 into a filer, containing its own editing commands to print pages in a report generation-style of operation. INQUIRE PAC features full sorts and true searches, up to 200 records, conditional searches by up to 15 fields with optional sort on any one field at the same time, sorts on numeric threshold, disk and file directories, multiple delete function and deleted file collect.
Omnifile Ver-1	Software to Go	64 VIC	Systems/Database Management Systems	OMNIFILE is a file manager that can be used for inventories, mailing lists, collection and other information applications. The program provides plain language commands which make it easy to use. The report generating feature, ANYREPORT, gives you reports to fit special needs with four sort levels, counts, averages, totals and multiple conditions available. Ideal for applications in law, finance, medicine, marketing, and other professions. Up to ten key fields can be used.
Rabbitbase	Computer Software Associates	VIC	Systems/Database Management Systems	RABBITBASE is a data file manager for the Commodore VIC 20 with simple screen instructions for efficient use.
Information Management System	Tab Books Inc.	VIC PET	Systems/Database Management Systems	This program is a unique databased management system. It allows highly flexible, user-defined management using only an up grade ROM system with 16K. Information Management System uses a single cassette player rather than the more expensive disk drive.
Docu-Print	Computer House Division	PET	Systems/Database Management Systems	Prints anything on CRT out to printer. This is in BASIC and may be inserted in your program.
F.E.T. Recover 4.0	Computer House Division	PET	Systems/Database Management Systems	File editing tools; examine data files, fix destroyed pointers, sectors may be read, modified, displayed or written, and recharged. Contains the following commands: GET T-S (Get track & sector into buffer), PUT T-S (Put buffer back to track & sector), DISPLAY (Displays hex & characters of buffer), PRINT (Same as display on printer), FIND F (Finds file in directory), DRIVE I/O (Selects drive to be used for all subsequent commands), INIT (Initializes selected drive), Also MODIFY N-M, HMODIFY N-M, CHAIN N, and HUNT (finds beginning track and sector of all files in the directory).
Screen-Dump/Repeat	Computer House Division	PET	Systems/Database Management Systems	This system will print anything on a CRT out to the printer in machine language. The plus repeat feature allows the user to hold any key, including the cursor control keys, to repeat. This is similar to the repeat function on the 8032 CBM computer.
Scrunch-Plus	Computer House Division	PET	Systems/Database Management Systems	Packs a program, saves up to 25% of memory space.
Sof-Bkup 2.0	Computer House Division	PET	Systems/Database Management Systems	Copy diskettes faster than Commodore's disk copy. Copy all allocated blocks including random files. Displays error messages for all bad blocks.
Sorter	Computer House Division	PET	Systems/Database Management Systems	Sorts a one dimensional array alphabetically (in machine language).
Super-Ram	Computer House Division	PET	Systems/Database Management Systems	Diagnostic routine checks every possible RAM address against every other address on 8K, 16K, or 32K CBM computers.
Equipment Hire	Alphabet Company	PET	Professional/Industries Systems/Database Management	For maintaining records of up to 700 customers and 700 items on hire. System also maintains updates, billing, reminders, and files.
Trace-Print	Computer House Division	PET	Systems/Database Management Systems	Prints listing of all line numbers in order of execution as program is operated.
Vari-Print	Computer House Division	PET	Systems/Database Management Systems	Prints a listing of all variables in your program alphabetically plus every line number where variable occurs. Also leaves space for Programmer to write in comment or function of each variable.
Database Record Keeping System	Disk Dean Ltd.	PET	Systems/Database Management Systems Systems/Information Retrieval System	Extensive search list facilities and date character number and checking. Easily adapted to suit a specific specialized requirement and specialized adaptations service available.
Progrfile	Qwerty Computer Systems	PET	Systems/Database Management Systems	Organize your tapes, no program takes more than 3 minutes to find.
Petaid Ver-4+5	Sosoft Ltd.	PET	Systems/Database Management Systems	Basic programs structure and database manager with report generator.

Name	Vendor	Computer	Subjects	Description
			Systems/Information Retrieval Systems	
Flexfile	Total Control Software	PET	Systems/Database Management Systems	A database management system that includes lists for mailing labels and accounting reports.
Inquiry/Mail/Word	Computer House Division	8032	Commercial/Mailing Lists Systems/Database Management Systems	A specialized database program, 21 fields which include: two names, street address, city, state, zip, phone, country. Database will also include main interest, credit, date, ten keys and a 1600 character remark (scratch pad). Search for exact match or any part or phrase in any field. Print any record or all records. Retains last ten dates contacted. Sorts on up to any three fields simultaneously and prints labels. Also contains a small word processor which can sort on any three fields.

Spreadsheets

Easy Calc	Commodore	64	Commercial/Spreadsheets	EASY CALC is easy to use with editing functions and help screens. Allows bar charts and individually formatted tables. Features the viewing of four pages at once on the screen.
Calc Result	Computer Marketing Services Inc.	64	Commercial/Spreadsheets	CALC RESULT is a standard spreadsheet with added features to create a useful planning tool. This program features a three dimensional spreadsheet with 32 pages of 63 x 254 cells offering flexibility, graphic display on screen and printer, the ability to view as many as four pages at once through a window and split screen (allowing you to compare spreadsheets). It will help function online to make CALC RESULT'S features easy to use. The color coordinated cells speed calculations. 'If then else' with 'and', 'or' and 'not-else' functions in each cell give you unlimited possibilities for decision making. It has the ability to load VISICALC files.
PractiCalc 64	Computer Software Associates	64	Commercial/Spreadsheets	PRACTICALC 64 is the computer spreadsheet for the Commodore 64 with over 20 mathematical functions. This program has the ability to graph, sort and search for entries.
PS The Programmable Spreadsheet	Computer Software Associates	64	Commercial/Spreadsheets	PS is a computer spreadsheet that can handle the most complicated operations within the structure of a spreadsheet. You can program the PROGRAMMABLE SPREADSHEET with BASIC.
Insta-Calc Ver-1.0	Microsci Corporation	64	Commercial/Spreadsheets Personal/Finance	A financial spreadsheet program for the Commodore 64. With a step-by-step tutorial manual and computer created 'help' screens. INSTA-CALC features a maximum of 20 columns by 30 rows (600 cells) with protected formula cells to eliminate loss of data. Oversized label field, ability to copy or move rows and columns and cell replication are standard features. Also, partial spreadsheets may be extracted and overlaid from one spreadsheet to another. Up to 25 spreadsheets may be saved to a diskette. Bar and line graphing is available with INSTA-GRAPH.
Super Base 64	Precision Software Ltd.	64	Commercial/Spreadsheets Systems/Information Retrieval Systems	Key features of SUPERBASE 64 include large record size (1000), up to 128 items per record, definable and redefinable record formats, fast key access with selective retrieval, transaction linking, spreadsheet calculation feature between record fields, calculator, Help screens and links to EASY SCRIPT word processor and EASY SPELL spelling checker on the 64. Popular applications are available 'off the shelf'.
PractiCalc 20 PractiCalc Plus	Computer Software Associates	VIC	Commercial/Spreadsheets	PRACTICALC 20 AND PRACTICALC PLUS are electronic spreadsheets that turn your Commodore VIC 20 into a business computer.
VersaCalc	Anthro-Digital Inc.	PET	Commercial/Spreadsheets	Sorts VISICALC screens, allows creation of self-executing automatic processing modules in VISICALC. VERSACALC consists of tutorial, utilities and file manager to teach creative use of VISICALC functions which are documented poorly or not at all by Visicorp. User can automate VISICALC model processing, create help screens, sort VISICALC screens, print /SS.
VisiCalc	VisiCorp	PET	Commercial/Spreadsheets	Great for analyzing alternatives and forecasting. VISICALC displays an 'electronic worksheet' that automatically calculates nearly any number of problems in finance, business management, marketing, sales, engineering and other areas. Huge worksheet is like a blank ledger sheet or matrix. Input problems by typing in titles, headings & numbers. All numbers affected are recalculated and new results are displayed. You can ask 'what if?', analyzing more alternatives and forecasting more outcomes.
VisiCalc Business Financial Model	VisiCorp	PET	Commercial/Spreadsheets	This is a series of interrelated VISICALC work sheets designed to work with the VISICALC electronic spreadsheet program.

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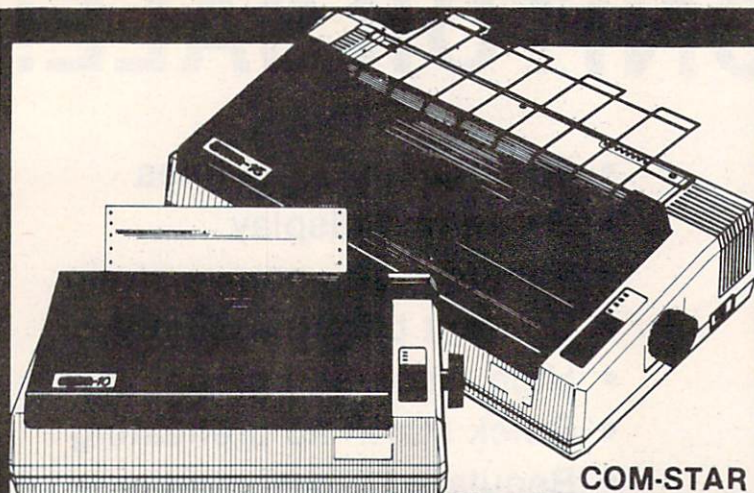
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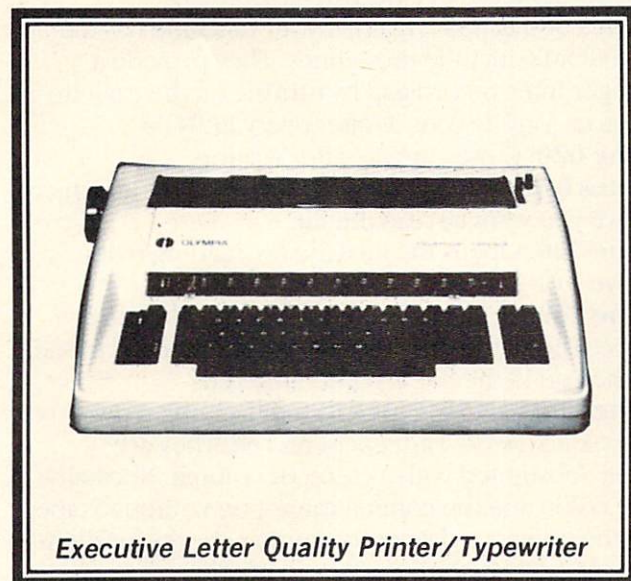
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Cassette Files for PET/CBM

By Robert Nicholas

One of the nice features of the Commodore computers is their ability to create data files on cassette tape. However, not much said about cassette files on the Commodore machines. Why?

Probably the most obvious reason why we don't hear much about cassette data files is because disk files are so much more convenient, flexible, and faster to work with. But even though cassette files aren't as luxurious as disk files, they are still useful, especially if you can't yet afford disk drives.

This article contains a program, written in Commodore BASIC, that will develop cassette files. The program was originally designed and tested on a CBM 8032, but can be adapted to any Commodore computer with a minimal amount of effort. It will work on systems with one or two tape drives; with old or new ROMs. The program also provides a way to write punctuation to the tape, something that couldn't be done with cassette files. I made use of Joe Rotello's wonderful universal data entry routine to do this (see *Commodore Magazine*, March 1983, pages 60-63). That piece of code adapted beautifully to this application.

The Program

To get started, just key in the attached listing. Please note that it will be easier to enter the code if your CBM is in text mode (upper and lower case (alphabets)).

Lines 10-50: Program header.

Line 60: Clears the screen, gets needed values for the program, and puts the computer in graphics mode. A FOR-NEXT loop is included here, and in other places, to provide a slight time delay after the computer jumps from one mode to another (text to graphics or vice-versa).

Lines 70-360: Draws the menu and branches to the choice selected (either CREATE A FILE, READ A FILE, or END THE PROGRAM). The graphics for the menu will have to be modified for 40-column machines.

Line 390: Builds a maximum data length string for use with the data entry routine. Change the variable UM in line 1070 to '39' for 40-column machines.

Lines 400-460: Ask for a file name, a secondary address option, and drive.

Lines 490 & 500: If your machine has old ROM's, remove the REM statements in front of these lines. The pokes will make sure the buffer pointers for the tape drives are initialized.

Line 510: Opens the data file for writing to drive 1 or 2.

Line 520: Clears the screen and puts the computer in upper and lower case mode.

Line 550: Prints the data to the file. The D\$ is a string of 79 characters long and is built up, character by character, by the data entry routine before it's written to tape. For 40-column machines, make sure the variable UM in Line 1070 is set to '39'.

Lines 580 & 590: Again, if your machine has the old ROM's, include these lines. They provide a longer inter-record gap by turning on the cassette motors for 0.1 seconds after every PRINT#.

Line 620: Closes the file after writing.

Lines 670-690: Ask for a file name and from which drive you want to read the file.

Line 700: Opens the data file for reading from drive 1 or 2.

Line 730: GETs each character of the file one at a time. The status variable (ST) is also checked to see if the end of the file was encountered.

Lines 740 & 750: Check to see if an up arrow (↑) or a back arrow (←) are encountered. They are then substituted with a colon or comma. Normally, the colon and the comma cannot be written to tape, so the universal data entry routine checks for them and makes the appropriate substitution.

Lines 810-840: Prompt you to hit the ESC key to return to the menu.

Lines 850-1020: Contain Mr. Rotello's universal data entry routine, with slight modifications. The routine screens out all characters with ASCII codes between 0 and 31 (except for DELETE), and those beyond 93. Due to the structure of the routine, the quotes (") aren't allowed. Also, as mentioned before, the up arrow and the back arrow cannot be used because they are replacements for the colon (:) and the comma (,), respectively.

Lines 1040-1090: Define important variables the program will use.

After the program has been entered, type RUN. You should see a menu appear with three choices; CREATE A FILE, READ A FILE, and END THE PROGRAM. Use the SPACE bar to move the pointer to the option you wish to select, then hit RETURN.

Creating a File

When creating a file, the computer will ask you for a file name, a secondary address option, and to which drive you want the file written. The secondary address is intrinsic to the OPEN command. Choosing a '1' will write your file to tape normally; that is, with an end-of-file (EOF) marker following the file. Choosing a '2' will write an end-of-tape (EOT) marker in addition to an EOF marker. This is useful if you don't want to put anything else on a particular cassette. If the computer is asked to read a particular file on a tape that doesn't contain it, and it comes across the EOT marker, the operation will abort and the computer will give you a ?FILE NOT FOUND message.

When you hit RETURN after entering a line of data, that line is stored in the cassette buffer of drive 1 or 2, depending on which was chosen to receive the data. The cassette buffers can hold 192 characters each. When they are full, the data is written to

the tape as a block. Don't type anything as the buffer is emptying because it won't be recorded. Wait until the cursor appears again before continuing to enter data. When you are finished, type an asterisk (*) on a blank line to close the file. You will then be asked to hit the ESC key to return to the menu, whereupon you may choose another option.

Reading a File

To read a file you have created, enter its name and the drive it will be read from. Note that as the computer is searching for the file, it will not tell you the files it has encountered, as it does when searching for program files. When it has found the proper file, the computer will respond with FILE OPEN... and the contents of the file will be printed on the screen. If the data comes too fast to be read, or if it begins to scroll off the screen, you may press the STOP button on the tape drive when it's in between reads; that is, when the motor is off. The program will continue to ask for more data from the drive, so if the PLAY button is not down, the computer will respond with a PRESS PLAY ON TAPE message. To continue reading in the data, just do as the computer says. When the EOF marker for the file is encountered, the file will be closed, and you can hit ESC to return to the

```

10 REM* UNIVERSAL CASSETTE DATA FILE
   DEVELOPER
20 REM*                PET/CBM
30 REM*                OLD/NEW ROMS
35 REM*                DESIGNED BY R. NICHOLAS
40 REM*                VERSION 2.0    05/23/84
50 REM*****
60 PRINT "[CLEAR]";GOSUB 1040
   :PRINT GS$:FOR I=1 TO 100:NEXT
   :POKE A5,P2
70 REM--MENU
80 FOR I=A1 TO A2:POKE I,P3:NEXT
90 FOR I=A2+80 TO A3 STEP 80
   :POKE I,P3:NEXT
100 FOR I=A3-1 TO A4 STEP -1
   :POKE I,P3:NEXT
110 FOR I=A4-80 TO A1+80 STEP -80
   :POKE I,P3:NEXT
120 PRINT TAB(15); "[RVS,SPACE2]
   UNIVERSAL CASSETTE DATA FILE
   DEVELOPER[SPACE2]/[SPACE2]V2.0
   [SPACE2]"
130 PRINT TAB(24); "[DOWN2]
   WHICH WOULD YOU LIKE TO CHOOSE?"
140 PRINT TAB(35); "[DOWN3]M E N U"
150 PRINT TAB(36); "- - - -"
160 PRINT TAB(33); "[DOWN]
   CREATE A FILE"
170 PRINT TAB(33); "[DOWN]READ A FILE"
180 PRINT TAB(33); "[DOWN]
   END THE PROGRAM"
190 PRINT TAB(17); "[DOWN6]USE THE
   [RVS]SPACE[RVOFF] BAR TO SELECT,
   THEN HIT [RVS]RETURN[RVOFF]."
200 PRINT CHR$(7);CHR$(7)
210 PRINT "[HOME,DOWN10,RIGHT28]";
220 GET CS
230 IF CS="" THEN PRINT "-->[LEFT3]";
   :GOTO 220
240 IF CS=SP$ THEN PRINT "[SPACE3,
   LEFT3]";
250 IF CS=CR$ GOTO 310
260 IF CS=SP$ AND LC=0 THEN LC=1
   :PRINT "[DOWN2]";:GOTO 220
270 IF CS=SP$ AND LC=2 THEN LC=0
   :PRINT "[UP4]";:GOTO 220
280 IF CS=SP$ AND LC<>0 THEN LC=LC+1
   :PRINT "[DOWN2]";:GOTO 220
290 IF CS=SP$ AND LC<>2 THEN LC=LC+1
   :PRINT "[DOWN2]";:GOTO 220
300 GOTO 220
310 ON LC+1 GOTO 320,330,340
320 PRINT TAB(33); "[RVS]
   CREATE A FILE":FOR I=1 TO 250:NEXT
   :GOTO 350
330 PRINT TAB(33); "[RVS]READ A FILE"

```



```

:FOR I=1 TO 250:NEXT:GOTO 350
340 PRINT TAB(33); "[RVS]
END THE PROGRAM":FOR I=1 TO 250
:NEXT:GOTO 350
350 PRINT "[CLEAR]";TS$;
:FOR I=1 TO 100:NEXT:POKE A5,P1
360 ON LC+1 GOTO 370,650,1030
370 PRINT TAB(34); "FILE CREATE"
380 PRINT TAB(34); "[SHFT E11]"
390 FOR I=1 TO UM:UE$=UE$+"[LEFT]"
:NEXT
400 INPUT "[DOWN2]ENTER FILE
NAME...."; N$
410 PRINT "ENTER ONE OF THE FOLLOWING
SECONDARY ADDRESS OPTIONS...."
420 PRINT TAB(5); "[DOWN,RVS]1[SPACE2]
-[SPACE2]NORMAL WRITE[SPACE31]"
430 PRINT TAB(5); "[RVS]2[SPACE2]-
[SPACE2]WRITE WITH END-OF-TAPE
BLOCK FOLLOWING FILE[DOWN]"
440 INPUT SA:IF SA<>1 AND SA<>2 GOTO
440
450 PRINT "WRITE TO WHICH DRIVE (1 OR
2)";
460 INPUT D:IF D<>1 AND D<>2 GOTO 460
470 REM--NOTE: INCLUDE LINES 490 &
500 ONLY IF YOUR MACHINE IS
EQUIPPED
480 REM--WITH OLD ROMS.
490 REM*IF D=1 THEN POKE 243,122
:POKE 244,2:GOTO 510
500 REM*POKE 243,58:POKE 244,3
510 OPEN 1,D,SA,N$
520 PRINT "[CLEAR]":POKE A5,P2
530 PRINT "NOW TYPE DATA TO BE
STORED.[SPACE2]TYPE A [RVS]*
[RVOFF] TO END THE FILE.[DOWN2]"
540 GOSUB 850
550 PRINT#1,D$
560 REM--NOTE: INCLUDE LINES 580 &
590 ONLY IF YOUR MACHINE IS
EQUIPPED
570 REM--WITH OLD ROMS.
580 REM*IF D=1 THEN POKE 59411,53
:FOR I=1 TO 100:NEXT:POKE 59411,61
:GOTO 600
590 REM*POKE 59456,207:FOR I=1 TO 100
:NEXT:POKE 59456,223
600 IF D$<>"*" GOTO 540
610 PRINT "[DOWN]CLOSING FILE..."
620 CLOSE 1
630 GOSUB 810
640 GOTO 70
650 PRINT TAB(35); "FILE READ"
660 PRINT TAB(35); "[SHFT E9]"
670 INPUT "[DOWN2]ENTER FILE
NAME...."; N$
680 PRINT "READ FROM WHICH DRIVE (1
OR 2)";
690 INPUT D:IF D<>1 AND D<>2 GOTO 690
700 OPEN 1,D,0,N$
710 PRINT "[CLEAR]":POKE A5,P2
720 PRINT "FILE OPEN...[DOWN2]"
730 GET#1,D$:IF ST AND 64 GOTO 780
740 IF D$="[BACK ARROW]" THEN D$=","
750 IF D$="[^]" THEN D$=":"
760 PRINT D$;
770 GOTO 730
780 CLOSE 1
790 GOSUB 810
800 GOTO 70
810 PRINT "[DOWN3]HIT [RVS]ESC[RVOFF]
TO RETURN TO THE MENU...."
820 GET R$:IF R$<>CHR$(27) GOTO 320
830 PRINT "[CLEAR]";GS$;
:FOR I=1 TO 100:NEXT:POKE A5,P2
:LC=0
840 RETURN
850 REM--UNIVERSAL DATA ENTRY ROUTINE
(BY JOE ROTELLO)
860 D$=""
870 GOSUB 890:IF AB$="" THEN PRINT "
[UP2]":GOTO 860
880 D$=LEFT$(AB$+ACS,UM):U1=0:UB=0
:AB$="":RETURN
890 AB$="":FOR I=1 TO 10:GET A$:NEXT
900 PRINT CU$( -V) "[LEFT]";
:FOR Z=0 TO 9:GET U1$
:IF U1$="" THEN NEXT:V=NOT V
:GOTO 900
910 U1=0:IF U1$>"" THEN U1=ASC(U1$)
AND 127:IF U1=13 THEN PRINT " "
:RETURN
920 IF (U1<32 OR U1>95) AND U1<>20 OR
U1=34 OR U1=94 OR U1=95 GOTO 900
930 UB=LEN(AB$):IF U1=20 AND UB<1
GOTO 900
940 IF U1=20 AND UB=1 THEN PRINT "
[RVOFF] [LEFT] [LEFT]";:GOTO 890
950 IF U1=20 THEN AB$=LEFT$(AB$,UB-1)
:PRINT "[RVOFF] [LEFT] [LEFT]";
:GOTO 900
960 IF UB=UM-6 THEN PRINT CHR$(7);
CHR$(7);
970 IF UB=UM GOTO 920
980 PRINT U1$;
990 IF U1=44 THEN U1$="[BACK ARROW]"
1000 IF U1=58 THEN U1$="[^]"
1010 AB$=AB$+U1$:IF UM=1 THEN PRINT "
":RETURN
1020 GOTO 900
1030 END
1040 REM--TABLE OF VARIABLES &
CONSTANTS
1050 TS$=CHR$(14):GS$=CHR$(142)
1060 CR$=CHR$(13):SP$=CHR$(32):LC=0
1070 CU$(0)=CHR$(175):CU$(1)=CHR$(32)
:UM=79
1080 A1=32768:A2=32847:A3=34767
:A4=34688:A5=59468
1090 P1=12:P2=14:P3=102:RETURN

```


Random Video Art

Even on the smallest computers like the Commodore VIC or the ancient 4K PET, you can produce fascinating dynamic video art if you use random factors wisely. I'll give full details of one very simple program, *Zigzag* and outline the structure of another, *Snake*. I hope that you will take the concept and go on to bigger and better programs yourself.

Zigzag produces ever-changing op art patterns on the screen. It uses the graphics symbols found on the M and N keys on the Commodore home computers. These symbols will be shown as [shift-M] and [shift-N] in the listings here. They correspond to backwards slash and slash symbols which fill the full height of the character cell on the screen.

The first, and quite nice, version of *Zigzag* is just:

```
5 A$="[shift-M]": IF RND(1)<.5 THEN
  A$="[shift-N]"
10 FOR I=1 TO 1+40*RND(1): PRINT
  A$;: NEXT I
15 GOTO 5
```

Try it! I think you'll enjoy the effect for quite awhile.

When the simple *Zigzag* gets tiresome, move to a slightly higher level of randomness. The constant average length of the loop in line 10 gets predictable. Make it variable, within a controlled random distribution, with the following:

```
3 X=1+80*RND(1): FOR J=1 TO
  1+40*RND(1)
5 A$="[shift-M]": IF RND(1)<.5 THEN
  A$="[shift-N]"
10 FOR I=1 TO 1+X*RND(1): PRINT A$;:
  NEXT I
15 NEXT J
20 GOTO 3
```

This program changes the inner loop of the original *Zigzag* by replacing the constant 40 with X, a random number between one and 81. It also has a memory in that it repeats the lines 5 and 10 a random number of times (the J loop) before changing to a new value of X. So, for awhile, the display is really jagged and chaotic. Then, randomly, there are patches of longrange order. That makes for a varied and attractive display.

You can imagine further extensions of *Zigzag* to

still higher levels of randomness. Perhaps changing the graphics characters to other symbols which fit together nicely would be worthwhile. Or perhaps keeping more of a memory from row to row of the display would help.

Snake is an example of such an extension in a different direction. The program is only 20 or so lines long in BASIC, but it's easier to describe in words. (If there is a great outcry, I'll print a listing in a future column.) *Snake* uses the graphics symbols found on the U, I, J and K keys, little 90-degree arcs of circles, in addition to the straight line symbols found on @ and . The basic visual effect is that of a snake leaving a wild trail as it slithers around the screen.

Inside *Snake*, I define strings using graphics symbols and cursor control characters to draw lines up, down, left and right. I also define strings to make smooth curves around corners: up-to-right, up-to-left, left-to-down, etc., (eight possible corners). Then, randomly, I let the snake run straight, turn 90 degrees clockwise or turn 90 degrees counter-clockwise, each with equal probability of one third.

The result is a pleasing visual pattern that constantly grows new details. By using direct PRINT statements and cursor control characters, there is no problem with going off the edge of the screen. When the snake tries to go off the top, it just doesn't move. Going off left or right edges makes it reappear on the opposite side. Going off the bottom scrolls the screen image up, giving new blank area for the image to develop.

Watching *Snake* is a lot like watching clouds. If you have enough imagination, you can see faces, animal shapes, maps of continents and so on. It's always new because of the controlled randomness in the pattern of the snake's motions. I've added some simple sound commands which give audio accompaniment, too.

In Times to Come

The concept of levels of randomness is a very powerful one, which we will explore further in future columns. One of the ways to quantify randomness is by looking at the spectrum of random fluctuations that a given distribution produces. It's just like the spectrum of light that a prism (or a rainbow) displays or like the audio spectrum that a spectral analyzer or graphic equalizer can display. Random noise can be white, pink or something else. We'll talk about that and more next time! C

Two High-Resolution Screen Dumps for the Commodore 64

Use these programs with your Commodore 64, 1541 disk drive and Commodore dot-matrix printer to print out high-res graphics you've created with LOGO, the KoalaPad or using the standard Kernal SAVE routine.

Utility for the 1515, 1525, and MPS-801 Printers

By Steve Beats, Commodore Software

This program was originally created to speed up screen dumps from LOGO, which normally can take up to 20 minutes. Using this program those same screens can be dumped in about two minutes. But we've now added a few touches that also allow you to use the program to dump screens you've saved from the KoalaPad or screens you've saved using the good old standard Kernal routines, as well.

To use the programs, first type in Listing 1 and save it onto a formatted disk. Make sure you get all the data statements correct or the finished program will not work. When you have typed in this program and saved it, just type RUN and it will generate a machine code file named L10.BIN on the disk. This machine code file is used by the program in Listing 2.

Next type in the program in Listing 2 and save it onto the same disk as Listing 1. You can give this program any name you like except for L10.BIN.

Use this program as is to dump LOGO screens. To use it to dump Koala screens put a REM at the

beginning of line 171 and take out the REM at the beginning of line 170. To use it to dump standard Kernal screens put a REM in line 171 and leave the REM in line 170.

To use the program, simply load the program you typed in from Listing 2 and run it. The machine code section will be loaded in automatically. When the program asks you for the name of the file to print, just enter the name you used to save the picture screen. (If the screen is saved on a separate disk, remember to put that disk in the drive, first.)

After the screen has been loaded from disk you will be asked to position the paper and press the space bar to start the printing. Once the picture has been printed you can produce another copy by answering "Y" to the "ANOTHER COPY?" prompt.

Utility for the 1526 Printer

By John McKean

The program in Listing 3 allows you to dump the high-res screens you saved from LOGO, Koala or the standard Kernal routines using your 1526 printer.

To use the program for LOGO screens remove the REM in line 3001. For Koala screens remove the REM in line 3002. For standard screens, use it as is.

First, of course, type and save the program. To use it, just run the program and enter the name of the picture screen.

It takes about ten minutes for the printer to grind out a finished copy. But it's worth the wait.

Listing 1.

10 REM PROGRAM TO GENERATE A BINARY	80 REM UTILITY.
FILE	90 :
20 REM ON A FORMATTED 1541 DISK	100 POKE 53281,0:POKE 53280,0
30 :	:POKE 646,1
40 REM THE DATA PRESENTED HERE WILL	110 PRINT"[CLEAR]PLEASE INSERT THE
GENERATE	DISK WITH THE BASIC
50 REM THE MACHINE CCODE PROGRAM	120 PRINT"[DOWN]PART OF THIS SCREEN
CALLED L10.BIN	DUMP UTILITY INTO
60 REM SO THAT IT CAN BE DIRECTLY	130 PRINT"[DOWN]THE DISK DRIVE AND
LOADED IN BY	PRESS THE SPACE BAR
70 REM THE BASIC SECTION OF THIS	135 :
SCREEN DUMP	140 GET A\$:IF A\$<>" "THEN 140


```

:REM WAIT FOR SPACE BAR
150 OPEN 15,8,15,"I0"
:REM INITIALISE DISK
160 PRINT#15,"S0:L10.BIN"
:REM MAKE SURE FILE IS NOT THERE
170 CLOSE 15
:REM EVERYTHING IS READY
180 OPEN 8,8,8,"L10.BIN,P,W"
:REM OPEN PROGRAM FOR WRITE
190 PRINT#8,CHR$(0)CHR$(112);
:REM START ADDRESS (~7000)
200 READ A
:REM GET A BYTE OF ML
210 IF A<0 THEN 240
:REM GOT TO END OF DATA
220 PRINT#8,CHR$(A);
:REM WRITE OUT THE DATA
230 GOTO 200
:REM AND REPEAT UNTIL THE END
240 CLOSE 8
250 END
260 :
270 :
280 :
290 :
1000 DATA 76,9,112,76,43,112,76,79
1010 DATA 112,162,0,142,183,2,169,128
1020 DATA 141,184,2,24,189,183,2,105
1030 DATA 64,157,185,2,189,184,2,105
1040 DATA 1,157,186,2,232,232,224,50
1050 DATA 208,233,96,169,128,133,252,
160
1060 DATA 0,132,251,32,204,255,162,8
1070 DATA 32,198,255,32,228,255,145,
251
1080 DATA 165,144,208,7,200,208,244,
230
1090 DATA 252,208,240,32,204,255,96,
169
1100 DATA 0,141,170,2,32,204,255,162
1110 DATA 4,32,201,255,169,15,141,176
1120 DATA 2,32,210,255,169,0,141,167
1130 DATA 2,141,168,2,141,171,2,173
1140 DATA 170,2,141,175,2,14,175,2
1150 DATA 10,10,109,170,2,109,175,2
1160 DATA 141,175,2,169,6,141,172,2
1170 DATA 169,7,141,173,2,173,175,2
1180 DATA 141,169,2,32,39,113,110,174
1190 DATA 2,238,169,2,206,173,2,208
1200 DATA 242,56,110,174,2,173,174,2
1210 DATA 174,172,2,157,176,2,238,167
1220 DATA 2,208,3,238,168,2,206,172
1230 DATA 2,208,205,162,5,189,177,2
1240 DATA 41,127,208,26,202,16,246,173
1250 DATA 176,2,201,15,240,8,169,15
1260 DATA 141,176,2,32,210,255,169,32
1270 DATA 32,210,255,76,248,112,173,
176
1280 DATA 2,201,8,240,8,169,8,141
1290 DATA 176,2,32,210,255,162,5,189
1300 DATA 177,2,32,210,255,202,16,247
1310 DATA 238,171,2,173,171,2,201,54
1320 DATA 240,3,76,131,112,169,8,141
1330 DATA 176,2,32,210,255,169,13,32
1340 DATA 210,255,238,170,2,173,170,2
1350 DATA 201,29,240,3,76,100,112,169
1360 DATA 15,32,210,255,76,204,255,173
1370 DATA 168,2,240,9,173,167,2,201
1380 DATA 64,144,2,24,96,173,169,2
1390 DATA 201,200,176,247,173,169,2,74
1400 DATA 74,41,254,170,189,183,2,133
1410 DATA 251,189,184,2,133,252,173,
167
1420 DATA 2,41,248,24,101,251,133,251
1430 DATA 173,168,2,101,252,133,252,
173
1440 DATA 169,2,41,7,168,173,167,2
1450 DATA 41,7,170,177,251,61,116,113
1460 DATA 240,193,56,96,128,64,32,16
1470 DATA 8,4,2,1,-1

```

1525 Dump

```

10 REM *****
20 REM *
30 REM * LOGO SCREEN DUMP UTILITY *
40 REM * WRITTEN BY STEVE BEATS *
50 REM * BASED ON AN IDEA BY *
60 REM * TOM ZIEGLER *
70 REM *
80 REM *****
90 :
100 IF PEEK(7*4096)=76 THEN 130
110 PRINT"[CLEAR]LOADING MACHINE CODE
... PLEASE WAIT"
120 LOAD"L10.BIN",8,1
130 POKE 56,112:CLR
:REM PROTECT MACHINE CODE
140 MC=7*4096
:REM ADDRESS OF MACHINE CODE
150 SYS MC
:REM SET UP POINTERS ETC.
160 INPUT"[CLEAR]NAME OF FILE TO
PRINT";A$
170 C$=CHR$(129):IF LEN(A$)<14 THEN
A$=A$+LEFT$("[SPACE9]",14-LEN(A$))
171 REM *LOGO*:C$="":IFRIGHT$(A$,
5)<>".PIC1"THEN A$=A$+".PIC1"
180 OPEN 15,8,15,"I0"
:REM INITIALISE DRIVE
190 OPEN 8,8,8,C$+A$+",P,R"
:REM CHECK FILE IS THERE
200 INPUT#15,EN,ERS,TR,SE
210 IF EN=0 THEN 260
:REM FILE IS THERE OK
220 PRINT EN;ERS:PRINT"[DOWN]
DISK ERROR. PRESS SPACE TO
CONTINUE"
230 CLOSE 8:CLOSE 15
:REM CLOSE FILES FOR NEXT TIME
AROUND

```



```

240 GET AS:IF AS<>" "THEN 240
250 GOTO 160
    :REM TRY AGAIN
260 GET#8,B$,C$
    :REM STRIP OFF THE START ADDRESS
270 PRINT"[DOWN]LOADING FILE. PLEASE
    WAIT"
280 SYS MC+3
    :REM GO AND LOAD IN THE DATA
290 CLOSE 8:CLOSE 15
    :REM ALL LOADED NOW
300 PRINT"[CLEAR,DOWN]
    "AS" IS NOW IN MEMORY"
310 PRINT"[DOWN]POSITION PAPER AND
    PRESS 'P' TO PRINT"

```

```

330 GET B$:IF B$<>"P"THEN 330
340 OPEN 4,4:PRINT#4:CLOSE 4
350 IF ST=-128 THEN PRINT"[DOWN]
    PRINTER IS NOT SWITCHED ON"
    :FOR I=1 TO 20,0:NEXT:GOTO 300
360 OPEN 4,4:SYS MC+6
    :REM GO AND PRINT THE PICTURE
370 CLOSE 4 :REM ALL DONE
380 PRINT"[CLEAR,DOWN2]
    ANOTHER COPY ? (Y/N)"
390 GET B$:IF B$<>"Y"AND B$<>"N"THEN
    390
400 IF B$="Y"THEN 300
    :REM GO DO ANOTHER COPY
410 END

```

1526 Dump

```

3000 C$=CHR$(129):INPUT"FILENAME";AS
3001 REM *LOGO*:IFRIGHT$(AS,
    5)<>".PIC1"THENAS=AS+".PIC1"
3002 REM *KOALA*:AS=C$+AS
    :IFLEN(AS)<15THENAS=AS+LEFT$("
    [SPACE9]",15-LEN(AS))
3010 FOR X=1 TO LEN(AS)
    :POKE 49151+X,ASC(MID$(AS,X,1))
    :NEXT X:POKE X,0
4000 POKE 780,5:POKE 781,8:POKE 782,0
    :SYS 65466
4001 POKE 780,LEN(AS):POKE 781,0
    :POKE 782,192:SYS 65469
4002 POKE 780,0:POKE 781,0:POKE 782,32
    :SYS 65493
4005 POKE 52,32:POKE 56,32
4015 OPEN 5,4,5:OPEN 4,4
4019 COUNTER=0:BASE=8192:GOSUB 5000
4024 FOR BYTE = 0 TO 7
4026 A = PEEK(BASE+BYTE)
4028 POKE 965+BYTE,A
4030 NEXT
4032 BASE=BASE+8:IF BASE>16192 THEN
    CLOSE 4:CLOSE 5:END
4034 AS="":SYS 828
4036 FOR BYTE = 0 TO 7
4038 A = PEEK(973+BYTE)
4040 AS=AS+CHR$(A)
4042 NEXT
4044 PRINT#5,AS
4046 PRINT#4,TAB(COUNTER)CHR$(254)
    CHR$(141);
4048 COUNTER=COUNTER+1
    :IF COUNTER=40 THEN PRINT#4,
    CHR$(13):COUNTER=0
4050 GOTO 4024
5000 REM
5002 OPEN 6,4,6:PRINT#6,CHR$(10)
    :CLOSE 6
5003 B=0:FOR DE=828 TO 980
5004 READ A
5006 POKE DE,A:B=B+A
5008 NEXT

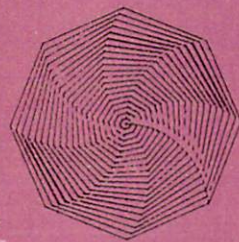
```

```

5010 IF B<>17120 THEN PRINT"ERROR IN
    DATA STATEMENTS":END
5012 RETURN
6000 DATA 162,7,169,0,157,205,3,202
6010 DATA 224,255,208,248,169,128,141,
    196
6020 DATA 3,172,0,160,0,189,197,3
6030 DATA 10,157,197,3,32,183,3,200
6040 DATA 192,8,240,2,208,239,232,160
6050 DATA 0,224,1,240,28,224,2,240
6060 DATA 31,224,3,240,34,224,4,240
6070 DATA 37,224,5,240,40,224,6,240
6080 DATA 43,224,7,240,46,224,8,240
6090 DATA 49,169,64,141,196,3,208,197
6100 DATA 169,32,141,196,3,208,190,169
6110 DATA 16,141,196,3,208,183,169,8
6120 DATA 141,196,3,208,176,169,4,141
6130 DATA 196,3,208,169,169,2,141,196
6140 DATA 3,208,162,169,1,141,196,3
6150 DATA 208,155,96,144,10,24,185,205
6160 DATA 3,109,196,3,153,205,3,96
6170 DATA 0
6180 DATA 0,0,0,0,0,0,0,0
6190 DATA 0,0,0,0,0,0,0,0

```

C



Kaleidoscope for the PET and Commodore 64

By Jerry A. Sturdivant

This program creates, smooth flowing, ever changing psychologically pleasing designs and quite a surprise if you hit the STOP key. If the designs become too involved, you can push the space bar. Or, after about 15 seconds, the screen will clear itself. The program is a continually running art display.

The program puts a random design in the upper left quarter of the screen. The other three quarters of the screen are, like our childhood kaleidoscopes, a mirror reflection. Well, not a perfect reflection; if you were to type the letter E, the pointy parts would still point to the right. For that reason, the items sent to the screen are symmetrical.

The interrupt is directed through the machine language portion of the program. It creates the three mirror images.

You can change the items that print to the screen by placing

them between the quotes in line 170. If you change the number of characters between the quotes, enter the number in the parenthesis following FNR. You can create softer designs with a larger number in the parentheses in line 160.

While the program is running, you can start a new design by pressing the space bar or STOP the program by hitting S. But if you hit the STOP key instead, you're in for surprise — four cursors! Move the cursors around or type your name and you will see the mirror effect. Any commands you wish to enter must be followed by a colon or the computer will try to use the mirror image (restart the program again with RUN: and don't forget the colon).

Operation

Line 100 is used for all the random numbers. Line 130 picks a

random location in the upper left screen quarter for a starting place. Lines 140 and 150 watch for keyboard inputs. Line 160 decides the length of a design. Line 170 picks one of the characters. Line 180 picks a number for a direction (be careful when entering the spaces). Line 210 checks to see if the POKES are going out of the screen quadrant to the right. 220 checks the vertical boundaries. For the Commodore 64, line 105 turns the screen black. Line 165 picks a color and 225 POKES it in.

If you think the program would look better at a faster speed, follow the instructions on the last program line. Remove the REM from line 235 and insert a REM at the beginning of lines 330 and 340. This will change the operations to SYS rather than being interrupt driven. However, you will lose the four-cursor effect.

Kaleidoscope PET

```

10 REM          KALEIDOSCOPE
20 REM    BY JERRY STURDIVANT
30 REM
40 PRINT"[CLEAR]"TAB(12)"KALEIDOSCOPE
  [DOWN2]
50 PRINT"[SPACE4]HIT SPACE BAR TO
  CLEAR SCREEN[DOWN]
60 PRINT"[SPACE4]HIT 'S' TO STOP[DOWN]
70 PRINT"[SPACE4]HIT SPACE BAR TO
  START
80 GET A$:IF A$=""THEN 80
90 PRINT"[CLEAR,DOWN8]"TAB(15)"LOADING
100 DEF FN R(X)=INT(X*RND(1)+1)
110 GOSUB 300
120 PRINT"[CLEAR]":T=TI
130 S=32768+FN R(459)
140 IF PEEK(151)=83 THEN POKE 145,228
  :STOP
150 IF PEEK(151)<>255 THEN 120
160 L=FN R(12)
170 C=ASC(MID$("@@@@[SPACE4]QW#*Z",
  FN R(13),1))
180 D=VAL(MID$("-39[SPACE2]
  1 41 40 39 -1-41-40",FN R(8)*3-2,
  3))
190 FOR I=1 TO L
200 S=S+D
210 IF((S-8)/40-INT((S-8)/40))*40>19
  THEN 130
220 IF S>33247 OR S<32768 THEN 130
230 POKE S,C
235 REM SYS 3413

```



```

240 NEXT
250 IF TI-T>900 THEN 120
260 GOTO 140
270 REM
280 REM ** POKE MACHINE CODE **
290 REM -----
300 FOR I=3413 TO 3548
310 READ A:POKE I,A:B=B+A
320 NEXT
330 IF B-13824 THEN PRINT "BAD DATA"
:STOP
340 POKE 145,13
350 RETURN
360 DATA 162,0,160,20,189,0,128,153,
19,128,157,152,131,153,171,131,
232,136,192
370 DATA 0,208,238,24,169,40,109,90,
13,141,90,13,173,91,13,105,0,141,
91,13,24

```

```

380 DATA 169,40,109,93,13,141,93,13,
173,94,13,105,0,141,94,13,56,173,
96,13,233
390 DATA 40,141,96,13,173,97,13,233,0,
141,97,13,56,173,99,13,233,40,141,
99,13
400 DATA 173,100,13,233,0,141,100,13,
173,99,13,201,203,208,159,169,128,
141,91
410 DATA 13,141,94,13,169,131,141,97,
13,141,100,13,169,0,141,90,13,169,
19,141
420 DATA 93,13,169,152,141,96,13,169,
171,141,99,13,76,85,228
430 REM CHANGE 76 (DATA LINE 420) TO
A 96, AND
440 REM 'REM' OUT LINES 330 & 340 FOR
SPEED

```

Kaleidoscope 64

```

10 REM          KALEIDOSCOPE
20 REM          BY JERRY STURDIVANT
30 REM
40 PRINT"[CLEAR]"TAB(12)"KALEIDOSCOPE
[DOWN2]
50 PRINT"[SPACE4]HIT SPACE BAR TO
CLEAR SCREEN[DOWN]
60 PRINT"[SPACE4]HIT 'S' TO STOP[DOWN]
70 PRINT"[SPACE4]HIT SPACE BAR TO
START
80 GET A$:IF A$=""THEN 80
90 PRINT"[CLEAR,DOWN3]"TAB(15)"LOADING
100 DEF FN R(X)=INT(X*RND(1)+1)
105 POKE 53280,0:POKE 53281,0
110 GOSUB 300
120 PRINT"[CLEAR]":T=TI
130 S=1024+FN R(459)
140 IF PEEK(203)=13 THEN POKE 789,234
:STOP
150 IF PEEK(203)<>64 THEN 120
160 L=FN R(12)
165 K=VAL(MID$( " 1 2 3 4 5 6 7 8
9101314",FN R(12)*2-1,2))
170 C=ASC(MID$( "0000[SPACE4]QZZW*",
FN R(13),1))
180 D=VAL(MID$( "-39[SPACE2]
1 41 40 39 -1-41-40",FN R(8)*3-2,3))
190 FOR I=1 TO L
200 S=S+D
210 IF ((S+16)/40-INT((S+16)/40))
*40>19 THEN 130
220 IF S>1503 OR S<1024 THEN 130
225 POKE 54272+S,K
230 POKE S,C
235 REM SYS 8753
240 NEXT
250 IF TI-T>800 THEN 120
260 GOTO 140
270 REM
280 REM ** POKE MACHINE LANGUAGE **
290 REM -----
300 FOR I=8753 TO 9022

```

```

310 READ A:POKE I,A:B=B+A
320 NEXT
330 IF B-29847 THEN PRINT "BAD DATA":STOP
340 POKE 789,34
350 RETURN
360 DATA 162,0,160,20,189,0,4,153,19,4,
157,152,7,153,171,7,232,136,192,0,208
370 DATA 238,24,169,40,109,54,34,141,
54,34,173,55,34,105,0,141,55,34,
24,169,40
380 DATA 109,57,34,141,57,34,173,58,
34,105,0,141,58,34,56,173,60,34,
233,40,141
390 DATA 60,34,173,61,34,233,0,141,61,34,
56,173,63,34,233,40,141,63,34,173,54
400 DATA 34,233,0,141,64,34,173,63,34,201,
203,208,159,169,4,141,55,34,141,58
410 DATA 34,169,7,141,61,34,141,64,34,
169,0,141,54,34,169,19,141,57,34,
169,152
420 DATA 141,60,34,169,171,141,63,34,
234,162,0,160,20,189,0,216,153,19,
216,157
430 DATA 152,219,153,171,219,232,136,
192,0,208,238,24,169,40,109,188,
34,141,188
440 DATA 34,173,189,34,105,0,141,189,
34,24,169,40,109,191,34,141,191,
34,173,192
450 DATA 34,105,0,141,192,34,56,173,194,34,
233,40,141,194,34,173,195,34,233,0
460 DATA 141,195,34,56,173,197,34,233,40,
141,197,34,173,198,34,233,0,141,198
470 DATA 34,173,197,34,201,203,208,159,169,
216,141,189,34,141,192,34,169,219,141
480 DATA 195,34,141,198,34,169,0,141,188,
34,169,19,141,191,34,169,152,141,194
490 DATA 34,169,171,141,197,34,76,49,234
500 FOR SPEED REPLACE NUMBER 76 (DATA
LINE 490) WITH A 96 AND
510 AND UN REM 235-REM 330 & 340

```

C

Prime Numbers

By Craig R. Hessel

Prime numbers (2, 3, 5, 7, 11 and so on) are numbers which cannot be written as the product of smaller numbers. Several hundred years ago, the number one was also considered to be prime, but since then mathematicians have found it more convenient to exclude one from the definition. Prime numbers have long been objects of interest, since they are, in a sense, the building blocks for all numbers. Every integer greater than one is either prime or can be expressed as the product of primes. Every rational number can be written as the ratio of two integers. And every real number, including irrationals like pi and the square root of two, is the limit of a (possibly infinite) chain of rational numbers.

The ancient Greeks were the first to make an orderly study of primes. Euclid's "Elements" shows that there are an infinite number of them. His proof is short enough to paraphrase here: if there were only a limited number of primes, a new number could be formed by taking their product and then adding one to it. This new number would be prime since none of the other primes would divide evenly into it. But the new number can't be prime since all the primes have already been taken into account. As Mr. Spock would say, "That's illogical, Captain." So to make things logical, there must be an infinite number of primes.

If you look at a list of consecutive primes, you'll notice that they are rather unevenly spaced. Sometimes two odd numbers in a row are prime, like 881 and 883. Such pairs are called twin primes. At other times there may be a long gap in between primes. For example, 887 and 907 are both prime, while none of the intervening numbers are. In spite of this erratic behavior, mathematicians for a long time suspected that the average distribution of primes could be accurately described. In particular, they wanted a good way to estimate the total number of primes less than any given number.

In 1793, when he was only 16 years old, the young and later famous mathematician C. F. Gauss studied tables of primes and noticed that in the vicinity of each number N , there seemed to be about one prime for every $\text{LOG}(N)$ numbers. (This is the same natural logarithm function that is provided by

BASIC.) So Gauss speculated that the number of primes less than N could be estimated by integrating (which is like summing) the density function $1/\text{LOG}(X)$ from $X=2$ to $X=N$. Gauss and others tried unsuccessfully to show that this approximation tends to become more accurate with larger values of N . Finally, in 1896, J. Hadamard and C. Poussin independently proved this conjecture, which has come to be known as the Prime Number Theorem.

Program 1 uses the theorem to estimate the number of primes less than 1000. The result of 177 is only a few percentages off the actual count of 168 primes. By changing the value of N , you can get approximate prime counts up to but excluding 1000. For N equal to 10000, the error has dropped to



about one and a half per cent.

Although proving the Prime Number Theorem was a great achievement, there are always more questions in mathematics than there are answers. These three unresolved questions about primes have been around for quite awhile:

- 1 Is there an infinite number of twin primes?
- 2 Can every even number greater than two be expressed as the sum of two primes?
- 3 Are there infinitely many Mersenne primes?

The answer to all three questions seems to be yes, but no one yet knows for sure. The origin of the first question is unclear. The second question dates back to C. Goldbach (1742). The third question, which has an interesting history, dates back to M. Mersenne (1644).

Mersenne primes are primes of the form $2^N - 1$. It turns out that the exponent N must be prime in order for $2^N - 1$ to be prime. The first 12 Mersenne primes have 2, 3, 5, 7, 13, 17, 19, 31, 61, 89, 107 and 127 for their exponents. These were the only known Mersenne primes until the advent of computers in the 1950's. Actually, Marin Mersenne had compiled a list of all primes of this type through $2^{257} - 1$. At the time, the list astonished the mathematical world, since no one knew how he had accomplished the feat.

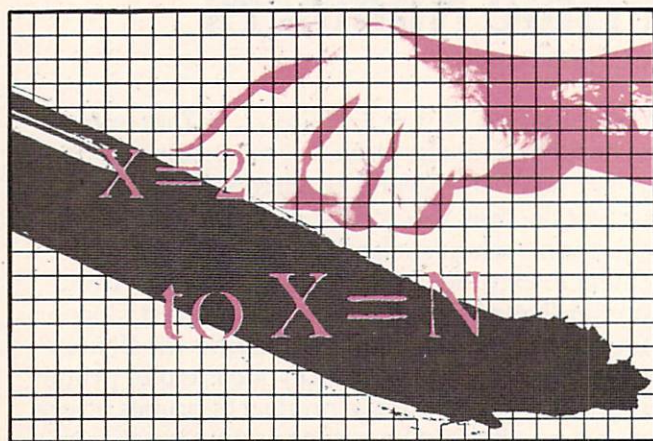
Eventually five errors (a surprisingly small number) were found on the list. The first was discovered more than two centuries after his original announcement and the last was found in 1922 when it was shown that $2^{257} - 1$ was, in fact, not prime. Today (at the time of writing), the largest explicitly known prime in the world is a Mersenne prime: $2^{132049} - 1$.

Program 6 for the 64 gives a hard copy decimal printout of this prime. You might want to run the program overnight, because about eight hours of machine language number crunching precede the actual printing. The program needs 19.5K buffer to hold the prime, which is 39,751 digits long. The printout fills up nearly eight pages at 80 characters per line and 66 lines per page. Here are its first and last few digits: 51274... 61311. You'll have to rely on your 64 for the rest.

Program 6A is an assembly listing of the machine language subroutine used in Program 6. The equates can be modified as needed for other Commodore computers or the exponent can be changed if a larger Mersenne prime is found. The subroutine is a significant improvement over the 150-hour method outlined for 6502 computers in the April, 1984, issue of *Scientific American*.

There are many ways to find primes. A simple way is illustrated in Program 2. Each odd number X up

to 1000 is tested by looking for possible divisors. Successive odd numbers, starting with three, are selected as trial divisors until either a true divisor is found or until the trial divisor is larger than the square root of X . There's no sense going any further. If X has a divisor larger than that, it also has a smaller divisor which would have been discovered earlier.



Program 3 uses a method which is over 2200 years old — the sieve of Eratosthenes. Instead of starting with a number and then looking for possible divisors, this method takes the opposite approach. It considers a divisor and then looks at its multiples. To see how it works, take out a sheet of paper and write down all the odd numbers from three to 99. Starting with three times three equals nine, cross out every third number on the list (9, 15, 21, ... 99). Now starting with five times five equals 25, cross out every fifth number. (Include in your count numbers already crossed out and don't worry about crossing out numbers for a second time.) Next, repeat the process with seven. Skip nine since it has been crossed out. Then stop, since eleven times eleven is greater than 99. The numbers which haven't been crossed out are prime.

Note that the program does not require any multiplications or divisions (other than by two). Squaring is accomplished with an adding technique. This makes the method especially suitable for machine code implementation. Some enterprising reader might try this with a 256K bit table to determine all the primes out to a half million or so.

The sieve method can also be extended so that large blocks of odd numbers, not necessarily starting from one, can be sifted. This, however, requires division, multiplication and an auxiliary table of small primes up to the square root of the largest number to be sifted. The sieve method finds batches of primes faster than the trial division method does. But if you just want to know whether or not a particular number is prime, the trial division method is a better choice.

Many of you have no doubt already encountered the above methods for finding primes. The next method may surprise you. Program 4 uses a probabilistic primality test that evolved in the later 1970's. The test subroutine takes as input an odd integer K. Then it generates a random number X between one and K and follows that with a mathematical test on X and K. The result of the test is either "K is definitely not prime" (PM=0) or "K is probably prime" (PM=1). If K is really prime, then PM will be one for every possible X. If K is really not prime, then PM will be incorrectly set to one for less than 25% of the possible values of X. Actually, for most non-prime values of K, the percentage is much less than that. Only for occasional numbers like 12403 is the 25% figure approached.

The main program calls the test subroutine up to five times for each possible prime K. If PM is ever zero, the testing loop is aborted since K is not prime. If PM is one five times in a row, then the program prints K, since the probability that K is prime is better than $1-(1/4)^5 = 1023/1024 = 99.9\%$. To reduce the chance of error even further, the number of iterations in the test loop can be increased. On the other hand, to show that the test is not infallible, decrease the number of iterations to one. Then, instead of correctly finding 167 odd primes less than 1000, the program will probably incorrectly come up with a few more.

Do not hold your breath when you run the program. This is not the fastest way to find primes with BASIC. It is, however, one of the fastest general methods known for finding large primes. The program "Cryptocode 5/83" (Issue 26) takes only a few minutes with the method to find primes over 50 digits long in the construction of cryptographic keys. The prime-finding subroutine is written in the language LIAL (Issue 28), which accommodates large integers. Although a probabilistic method will not give sure-fire results, it can come very close. More importantly, there is no known non-probabilistic method that could find such large primes on the 6502 in a reasonable amount of time. For example, the trial division method in LIAL would take about a million billion years to verify that a 50-digit number is prime. The warranty on your 64 would expire a little before that.

The largest primes known have generally been Mersenne primes. A keen interest in verifying Mersenne's list was probably the original motivation for this. But the primary reason now is a fast primality test discovered by E. Lucas in 1878 and improved by D. H. Lehmer in 1930. The test applies only to numbers of the form $2^N - 1$, where N is an odd prime.

Program 5 illustrates the method for small val-

Prime 1

```
100 REM ROUGH COUNT OF PRIMES
110 N=1000:C=0:FOR X=2 TO N
    :C=C+1/LOG(X):NEXT
120 PRINT"THERE ARE ABOUT"INT(C)
    "PRIMES TO"N:END
```

Prime 2

```
100 REM ODD PRIMES BY TRIAL DIVISION
110 N=1000:C=0:PRINT"COUNT","PRIME"
    :FOR X=3 TO N STEP 2:T=1
120 T=T+2:IF T*T>X THEN C=C+1
    :PRINT C,X:GOTO 140
130 Q=X/T:IF Q<>INT(Q) THEN 120
140 NEXT:END
```

Prime 3

```
100 REM ODD PRIMES BY SIEVE METHOD
110 N=1000:C=0:X=0:Y=0:Z=0:NN=N/2-1
    :DIM S%(NN):PRINT"COUNT","PRIME"
120 X=X+1:Y=Y+4:Z=Z+Y:IF Z>NN THEN 150
130 IF S%(X) THEN 120
140 FOR I=Z TO NN STEP X+X+1:S%(I)=1
    :NEXT:GOTO 120
150 FOR X=1 TO NN:IF S%(X)=0 THEN
    C=C+1:PRINT C,X+X+1
160 NEXT:END
```

Prime 4

```
100 REM ODD PRIMES BY PROBABILITY TEST
110 N=1000:ITER=5:DEF FN
    M(I)=I-K*INT(I/K):PRINT"COUNT",
    "PRIME"
120 FOR K=3 TO N STEP 2
    :FOR J=ITER TO 1 STEP -1:GOSUB 170
    :J=J*PM:NEXT
130 IF PM THEN C=C+1:PRINT C,K
140 NEXT:END
150 REM
160 REM RABIN TEST SUBROUTINE
170 X=INT((K-2)*RND(1))+2:Y=0:T=1
    :P=K-1
180 IF (P AND 1)=0 THEN Y=Y+1:P=P/2
    :GOTO 180
190 FOR I=14 TO 0 STEP -1:T=FN M(T*T)
    :IF P AND 2^I THEN T=FN M(T*X)
200 NEXT:I=0:IF T=1 THEN PM=1:RETURN
210 IF T=K-1 THEN PM=1:RETURN
220 I=I+1:IF I=Y THEN PM=0:RETURN
230 T=FN M(T*T):IF T=1 THEN PM=0
    :RETURN
240 GOTO 210
```


ues of N up to the limit of accuracy in BASIC. The Lucas-Lehmar test is fast only in comparison to other primality tests. A LIAL version of the test on the 64 took a little over two hours to show that $2 \uparrow 1279-1$ is prime. This is the largest Mersenne prime less than the LIAL large-integer limit of $2 \uparrow 2040$. A similar 6502 coding of the test applied to $2 \uparrow 132049-1$ would take about 250 years. Obviously, very fast computers are being used in the search for Mersenne primes.

Of what possible value are primes? The popular astronomer Carl Sagan once noted that we here on earth could advertise our presence as an intelligent species to the rest of the universe by simply broadcasting over and over again the first few prime numbers (up to, say, 100). Such a beacon could have no possible natural source. A more down to earth use of primes is in cryptography, where concealment of messages is the goal. See, for example, "Public-Key Cryptography For Commodore Microcomputers" (Issue 26). Curiously, the goal of cryptography is precisely the opposite of Sagan's beacon.

For those who like numbers, though, primes hold their own intrinsic fascination. As an analogy, think of primes as stars. The brightest stars, visible to the naked eye, are like the small primes we are all familiar with. Farther away are stars that we can see with hobby telescopes. These are like the primes we can easily find with BASIC. Just as all of these stars have been catalogued, so have all the primes out to at least a dozen or so digits. Still farther away are stars that can be detected only with high-power telescopes. These stars are so numerous that they have not all been catalogued. They await discovery by anyone who points the right equipment in their direction. These are like the large primes that can be found with a language like LIAL. Yet farther away are the most distant objects man can see—the quasars that recede from us at large fractions of the speed of light. These are like the large Mersenne primes that only the world's fastest computers can find.

Prime 5

```
100 REM MERSENNE PRIMES BY
    LUCAS-LEHMER TEST
110 DATA 3,5,7,11,13:W$(0)=" NOT"
    :W$(1)=" "
120 FOR J=1 TO 5:READ N:P=2^N-1:L=4
    :PM=0
130 FOR I=3 TO N:L=L*L-2
    :L=L-P*INT(L/P):NEXT
    :IF L=0 THEN PM=1
140 PRINT"2 [^]"N"- 1 ="P"IS"W$(PM)"
    PRIME":NEXT:END
```

Prime 6

```
100 REM C-64 PROGRAM TO HARD PRINT
    2^132049-1 IN DECIMAL FORM
110 POKE 55,0:POKE 56,32:CLR
    :ENTRY=12*4096:BUFFER=2*4096
120 POWER=132049:DIGITS=1+INT
    (POWER*LOG(2)/LOG(10))
    :BYTES=INT((DIGITS-1)/2)
130 SUM=0:FOR I=ENTRY TO ENTRY+92
    :READ X:POKE I,X:SUM=SUM+X:NEXT
140 IF SUM<>13237 THEN PRINT"CHECKSUM
    ERROR IN DATA STATEMENTS":END
150 PRINT"WAIT ABOUT 8 HOURS..."
    :SYS ENTRY
160 INPUT"TURN ON PRINTER THEN PRESS
    RETURN";A$
170 OPEN 4,4:PRINT#4,"THE
    FOLLOWING"DIGITS"DIGIT NUMBER IS
    THE LARGEST KNOWN ";
180 PRINT#4,"PRIME AS OF APRIL, 1984:"
    :PRINT#4:PRINT#4,"2 [^]"
    "POWER"- 1 = ";
190 FOR I=BYTES TO 0 STEP -1
    :T=PEEK(BUFFER+I):X=T/16+48
    :Y=(15 AND T)+48
200 IF I<BYTES OR T>9 THEN PRINT#4,
    CHR$(X);
210 PRINT#4,CHR$(Y);:NEXT:PRINT#4
    :CLOSE 4:END
1000 DATA 248,160,3,190,89,192,232,
    150,96,136,208,247,132,100,132,
    101
1010 DATA 32,82,192,144,20,177,101,
    113,101,145,101,200,208,247,230,
    102
1020 DATA 202,16,242,144,15,230,100,
    48,40,169,1,145,101,152,200,145
1030 DATA 101,200,208,251,32,82,192,
    198,99,208,218,198,98,208,214,198
1040 DATA 97,208,210,177,101,233,0,
    145,101,200,208,247,230,102,202,
    16
1050 DATA 242,216,169,32,133,102,166,
    100,24,96,2,3,209
```

C

Adding a Hex Keypad to Your PET/CBM

By Ronald E. Randolph

Years ago I added a full-sized keyboard to my original PET. This keyboard has a numeric keypad in addition to the alphabetic pad. I do a lot of work in the monitor, entering large numbers of hex numbers. Having my hand traversing the entire keyboard from the numeric pad to the alphabetic pad to enter the hex numbers makes for some tiring and frustrating hours. Typing in "Micromon" took me over two months.

You can construct a hex keypad for as little as \$5.00. Your new "everything is right at my fingertips in the same area" keypad will cut down dramatically on the time you spend with hex input.

You should purchase an *unencoded* keypad as opposed to one that is wired to output the ASCII code. An unencoded keypad will have no circuitry associated with the unit; you will probably see a number of IC chips and other components attached to an encoded keypad. However, if an encoded pad is the only type you can acquire, be sure to cut all of the p.c. board traces to all of the individual keys. I purchased an unencoded keypad from KO Enterprises, 1229 S. Napa Street, Philadelphia, PA 19146.

Your keypad should have at least 16 keys, one each for the letters A to F and for the numbers zero to nine. A 19- or 20-key pad is better. It will permit you to have such control keys as the RETURN and the cursor control keys. I plan to build another unit with 25 keys, allowing me more convenience functions.

In this article, I will assist you in constructing a 20-key unit. You should also be certain that the keypad you buy has only two terminals at the underside of each key switch. I have seen key switches with three or four terminals. I suspect that in such key switches, two of the terminals can be determined to serve as ordinary, normally off, momentary contact switches (the type we need). An ohm meter can be used to select the proper key pins. I have not, however, confirmed this.

If you open the PET, you will see a set of wires coming from the native keyboard and attached via a connector to a row of pins on the main p.c. board. The pins on the board are designated from left to right A to H and one to ten. The native key switches are wired in an eight-by-ten matrix, letter x number. If you short any pair of letter/number pins, the PET will respond with the printing of a character unique to that letter/number combination. The key switches serve to make these shorts each time you press a key.

Figure 1 gives you a list of the letter number combinations needed for a functional hex pad. A connection shorting any of these pairs will yield the character associated with that pair.

Construction

Refer to Figure 2. The arrangement of the key switches on the keypad is shown in 2a. That arrangement as seen from the bottom of the keypad is given in 2b. Note that in addition to the label

designation of each switch, I have labeled the pins with either a one or a two. My convention is to call the leftmost pin a one and the rightmost pin a two.

Figure 3 gives you the actual wiring to be made. My system of wiring directives will be familiar to any of you former electrical draftsman. There are basically two types of directives — one type for connections which go from switch to switch, and a modified directive syntax for those connections which go from switch to the terminal strip on the PET main circuit board. Here is an example of each directive:

KC2-K32	connect pin 2 of the 'C' switch to pin 2 of the '3' switch
KRTN1-TS.A	connect pin 1 of the 'RETURN' switch to pin 'A' of the keyboard terminal strip on the main circuit board.

All connections of the latter type should be made with flat flex cable. Be certain to provide strain relief at the point where your flat cable exits the keypad and also inside the PET chassis. This strain relief can be as simple as taping the cable down with some type of super strong adhesive tape, such as fiber-impregnated package sealing tape.

Do not be alarmed that the same directive appears more than once in Figure 3. This simply implies that there is more

than one connection placed on that terminal.

It was very cumbersome soldering wires to the pins on the keypad I used. The pins were too short to permit me to wrap the wires first on the pin and then solder them, or to conveniently solder more than one wire per pin. I solved this problem by taking the pins off of a wire wrap socket (cut them off close to the socket) and soldering one of these pins to each "one" and "two" pin of the key switches.

When you finally make the connections to the PET main board, be extremely careful not to short adjacent wires. It is here that you will probably be soldering the wires from your flex cable to the terminal strip. It is possible, however, to construct a piggyback connector which sandwiches in between the resident keyboard connector and the terminal strip. My full-sized keyboard is wired this way. I had to solder the hex pad to the strip since the pins were too short to permit another sandwich job. You must also be careful to avoid melting the plastic housing of the terminal pins with your iron.

After wiring the keypad, I made a housing for the unit from stiff corrugated cardboard. It is sturdy and lightweight. I plan to build another housing from lightweight balsa wood.

A little experimentation with the shorting of keyswitch pins will give you other characters. If you need characters other than the ones I have given codes for, drop me a postcard in care of this magazine and I can get them to you.

Key	Letter-Number Code	Key	Letter-Number Code
A	A5	4	G5
B	C7	5	G6
C	B7	6	H5
D	B5	7	G3
E	B3	8	G4
F	B6	9	H3
0	G9	SHIFT	F9 used with cursor keys
1	G7	RTN	F7 RETURN
2	G8	→	H1 cursor right/left
3	H7	↑	G2 cursor up/down

Figure 1. Codes for hex pad. The letter-number codes refer to the pins on the main circuit board terminal strip.

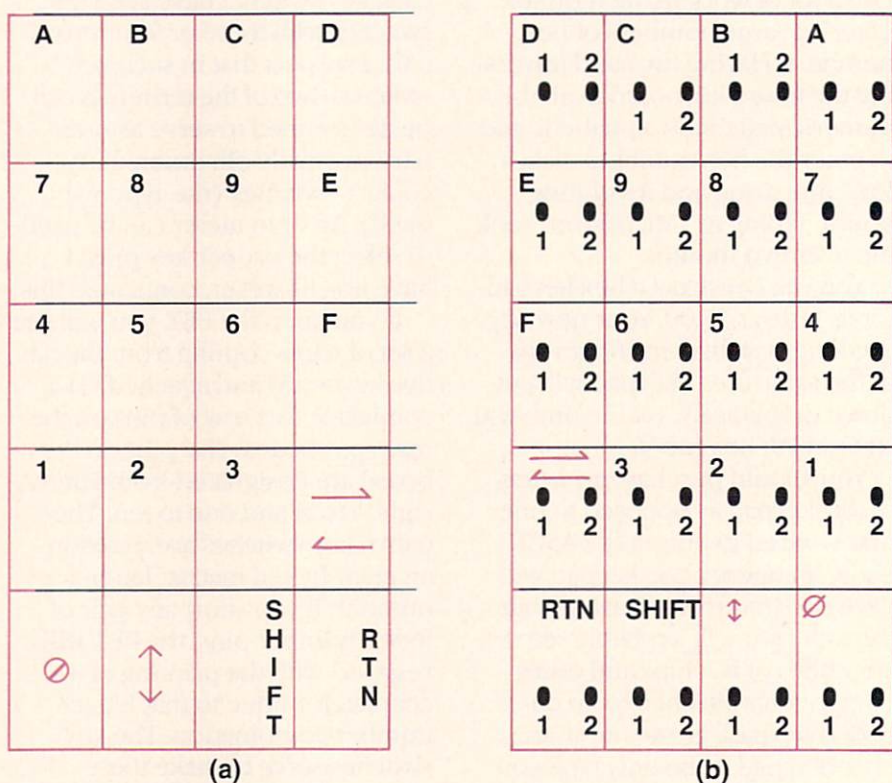
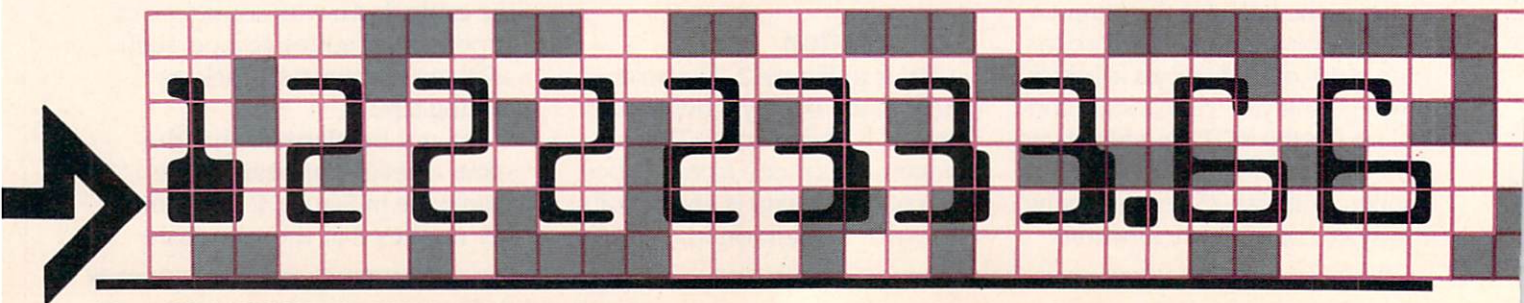
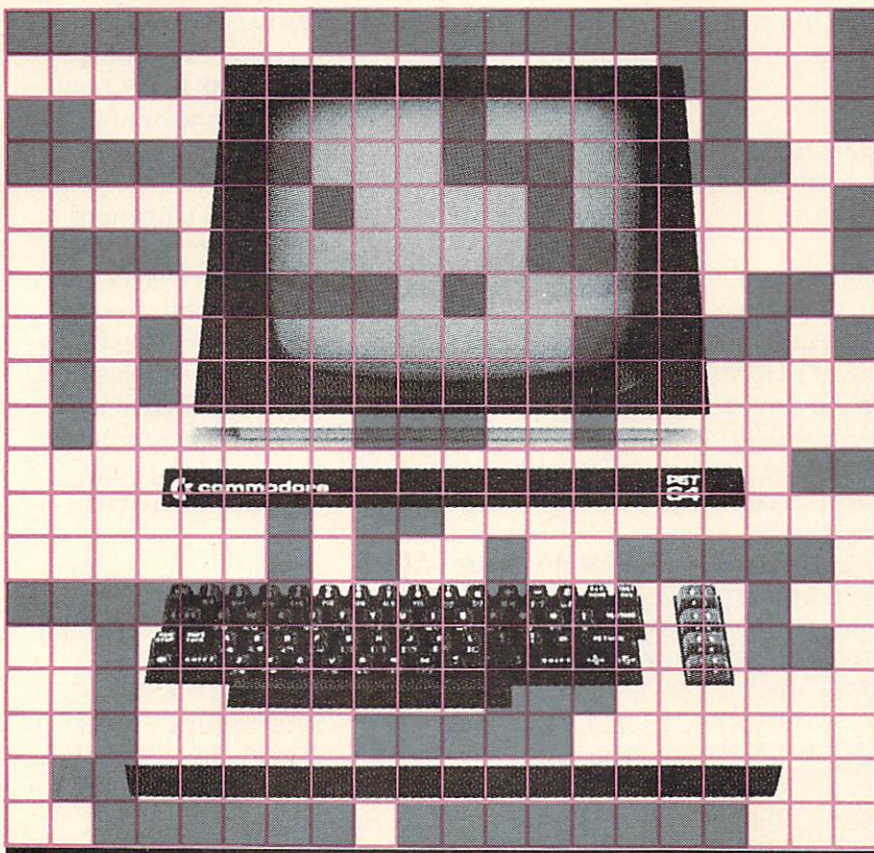


Figure 2. 2a shows the topside of your hex pad. 2b shows the bottom side with the key pins designated as 1 and 2. The designation KF2 refers to key switch "F," pin 2. Wire wrap pins were cut from their IC sockets and soldered to each keys' 1 and 2 pin. Flex cable connections were added last and were soldered to the upper part of the wire wrap pin.



Row 1	Row 2
KA2-TS.A	K01-K ↑ 1
KA1-KD1	K ↑ 1-TS.G
KD1-K62	K ↑ 2-TS.2
K62-K42	K81-TS.4
K42-TS.5	K72-K92
KB2-TS.C	K92-KE1
KB1-TS.7	K91-K61
KB1-KC2	K61-K31
KC2-K32	K31-K ↔ 2
KC3-K12	K ↔ 2-TS.H
K12-KRTN1	K ↔ 1-TS.1
KC1-TS.B	KF1-TS.6
KC1-KD2	KF1-K51
KD2-KE2	K21-TS.8
KE2-KF2	K02-TS.9
K72-TS.3	K02-KSHIFT2
K71-K82	KSHIFT1-KRTN2
K82-K52	KRTN-TS.F
K52-K41	
K41-K22	
K22-K11	
K11-K01	

Figure 3. Physical wiring chart. Start at the top of Row 1, going down that row completely. Start then, at the top of Row 2. "K" means "key switch." The syntax is "key label," "pin #," an example is K82, which is read as pin 2 of the "8" key. The symbol ↑ is the cursor up/down key. The symbol ↔ is the cursor right/left key.



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Inverse Trigonometric Functions

By Jim Butterfield

This is about trigonometric functions. (Sorry about that. I know that many readers would rather read about Space Gobblers or other neat games. But I gotta get this little math thing out of my system.)

Here's the thing: in the back of every Commodore user's guide is a table (usually Appendix H) called Deriving Mathematical Functions. Few people read it. Fewer people use it. But there's something in there that's *right*... although it's not *good*.

I'm talking about the inverse sine and the inverse cosine. I know, I can see you nodding your head, saying, "Yes, I've spent a lot of sleepless nights worrying about whether or not the inverse cosine formula was right..." But what can I tell you? Someday, you're gonna need an inverse cosine really bad and when you do it's gonna let you down.

There are more and more graphics in use on Commodore computers. The more you get seriously into graphics, the more you get into trig. Someday, you'll be glad we had this little talk.

How It Happened

I was writing a program to calculate great circle distances between any two points on the earth's surface. Now, we all know that the formula for distance is:

$$D = \arccos(\cos(\text{lat1}) * \cos(\text{lat2}) * \cos(\text{long1} - \text{long2}) + \sin(\text{lat1}) * \sin(\text{lat2}))$$

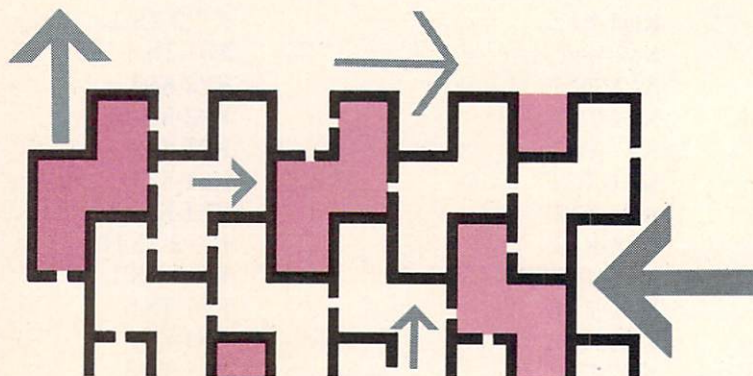
This ends up with distance as an angle ("Put on the coffeepot, I'm only a half degree away..."). How come? Well, it's the angle measured from the center of the earth between the two points. From there it's easy to change to miles or kilometers or whatever.

Here's the problem: if the two points are the same place, angle D turns out to be zero. If one is at the north pole and the other on the equator, angle D turns out to be 90 degrees. If one is at the north pole and the other at the south pole, angle D is 180 degrees. Does this make sense? It should if you think about it. Remember, it's the angle from the center of the earth.

We know our formula is along the lines:

$$D = \arccos(X)$$

and so for the three distance angles (0, 90 and 180),



we know that expression X must work out to 1, 0, and -1 respectively. If the computer had an arccos (ACOS) function, we could plug it in and work the value out immediately.

But we don't have ACOS, an arc cosine function. We have only ATAN, an arc tangent function. No problem. We whip open our Commodore user guide and dig out the formula which changes a cosine value to a tangent value. And we run into trouble.

The formula says:

$$\text{ARCCOS}(X) = \text{ATN}(X / \text{SQR}(-X * X + 1)) + \pi / 2$$

Aaaargh! Why can't they say, at least:

$$\text{ACOS}(X) = \pi / 2 - \text{ATN}(X / \text{SQR}(1 - X * X))$$

But that's not my problem. As we've noted for our three cases, X might have a value of 1, 0 or -1. The middle value (zero) works out OK to $\pi / 2$ (90 degrees). But whether we have plus one or minus one, $\text{SQR}(1 - X * X)$ turns out to be the square root of zero, and we can't divide by zero.

The problem boils down to this: the tangent of +90 degrees or -90 degrees is *infinity*. So, if you want to get a value of X that will produce 90 degrees on an ATN(X) function, X must be infinite. This is just a titch too high for Commodore's floating point notation. You can't make it in 40 bits of storage. I checked with a local university who has a 64-bit computer and it seems that they can't quite count to infinity either, although they're working on it.

In other words, you can't get there from here.

A New ASIN and ACOS

This problem can be neatly resolved by going to the half-angle formulas and messing about a bit. It works out as follows:

$$\text{ASIN}(X) = 2 * \text{ATN}(X / (1 + \text{SQR}(1 - X * X)))$$

$$\text{ACOS}(X) = \pi / 2 - 2 * \text{ATN}(X / (1 + \text{SQR}(1 - X * X)))$$

They are almost as compact as the previous formulas (or formulae, if you're into Latin) and they are almost as accurate. How do they work? They

work out values from -45 degrees to +45 degrees and then double the result. And the ATN function behaves well in this more limited range.

Distance Calculation

I hate to corrupt a mathematical treatise with a practical application, but I've already given the game away by quoting a distance formula. Here comes a simple distance calculator:

```
100 DATA MILES,3956.62
110 DATA KILOMETERS,6367.566
120 DIM L(2,2)
125 READ M$,M
130 INPUT "MILES OR KILOMETERS";T$
140 IF LEFT$(T$,1)="K" THEN READ M$,M
150 PRINT
160 FOR J=1 TO 2
170 GOSUB 300
180 NEXT J
190 A=L(1,1):B=L(2,1):C=L(1,2)-L(2,2)
200 X=COS(A)*COS(B)*COS(C)+SIN(A)*SIN
(B)
210 D=3.1415927/2-2*ATN(X/(1+SQR
(1-X*X)))
220 PRINT "DISTANCE = ";INT(D*M+.5);M$
230 END
300 PRINT "LOCATION";J
310 K=1:PRINT "LATITUDE:"
320 GOSUB 400
330 K=2:PRINT "LONGITUDE:"
340 GOSUB 400
350 RETURN
400 INPUT "DEGREES";L1
410 INPUT "MINUTES";L2
420 INPUT "SECONDS";L3
430 L(J,K)=(L1+L2/60+L3/3600)
*3.1415927/180
440 RETURN
```

You may, of course, use the pi symbol in place of the value 3.1415927 in lines 210 and 430.

Afterthought

One of the things I find fascinating about Commodore computers is that they all — every one — have a full set of mathematical functions worked out to full accuracy. Whether you have an inexpensive VIC 20 or a mighty SuperPET, you still have it all.

You may want to mess with the above program to have it print tables of distances from a given location, total mileage of an itinerary or whatever. If you want to use it for extremely small distances, remember that the cosine function is quite inaccurate in this area. The cosine of zero degrees is very close to the cosine of one degree. Look for other methods...

C

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Screen Box Data Display Routines

By Peter L. Knox

Controlling the nature and format of the data that goes into your programs is a fundamental requirement of good programming. Data with unexpected content or of unexpected length can easily ruin an otherwise well crafted program. The output from your programs, whether to the video monitor, the printer or the tape or disk drive, must be carefully controlled. In order to control the output, you must first control the input.

One way to control input is to have the computer present the operator with a box screen. The length of the box controls the length of the data that goes into it and comes out of it. While the operator is entering data into the box, the data can be screened character by character in order to weed out undesirable characters. Once the operator has finished with the box, the data in it can be screened for other program parameters. If the data in the box is unacceptable, the program can return to the box and demand correct data.

The screen box data routines illustrated in this program for the Commodore 64 can be used to control the location, color and length of a data box on the screen. The data box can contain statements such as operator prompts and error or reminder messages, or the box can accept operator responses or changes to data. These changes can then be acted upon by the program. The data boxes are all done without the use of

PRINT commands.

Line 100 skips over the subroutines and goes to the part of the program that you want to illustrate. In line 100 just change the GOTO number to 1000, 2000, or 3000.

Lines 2000-2800 illustrate a simple method of putting an error message or a prompt any place on the screen. The message is put into string variable Z\$ in line 2200. Line 2300 sets the row at eight and the column at four. This is where the box will start. Line 2400 sets the box length at 24 characters and its color at white. A list of other colors is contained in Appendix G of the owner's manual. Line 2500 goes to the subroutine (at 200) that will display the characters in Z\$ in the box. 200 will in turn call 400 to put the color into the boxes.

If you POKE characters to the screen without giving them a distinctive color, you won't be able to see them unless you happen to pass the cursor over the character. You will then see the POKed character flashing behind the cursor. Very annoying! Line 2600 simulates a reason why you might have a screen box prompt. Line 2700 puts one space into the box and then changes the box color to the screen color (blue in this case), thereby making the box disappear from view.

Line 212 determines the position on the video screen at which you are PEEKing or POKEing. 1024 is the memory address of the upper lefthand corner of the screen. See Appendix G in the 64

owner's manual for the complete screen map. R is the row down from the top of the screen and C is the column over from the left side of the screen. Line 215 determines the length of string variable Z\$ that is being fed into the screen box. If the variable is longer than the box, it will be cut off.

Lines 220 to 245 examine each character of string variable X\$, determine its ASCII number (see Appendix F of the 64 owner's manual) and convert it into a character-set-one POKEable number (see Appendix E of the 64 owner's manual). Line 235 converts these numbers to ones that will POKE the characters in reverse images, thus giving a screen box. Line 250 fills up the box with reverse image spaces if the variable is shorter than the box length. Line 255 calls the subroutine at 400 that will put the color into the box so that it can be seen.

Lines 400-460 put color into the screen box by POKEing the previously defined box color into the separate color memory for the screen character memory cells that contain the characters already POKed into the screen memory cells. Line 410 performs the same function as line 212, except that it POKes to the screen color cells instead of to the character cells. Line 420 starts a FOR/NEXT loop that loops once for each spot in the box. Line 430 POKes the color.

Lines 2000-2800 illustrate a statement displayed in a box. To be really useful though, the data in the box must be modified and

fed back into the program. The routine at 1000 shows how this works. Be sure to change line 100 first.

Line 1200 puts the desired data into string variable Z\$. Z\$ will be fed into the box, modified if desired and returned as Z\$. Line 1300 positions the start of the box at row eight and column four. Line 1400 sets its length and color. Line 1500 goes to the subroutine described above to display the data. In line 1600, CC=14 sets the box color when the operator exits. In this case, it will be light blue. The call to the subroutine at 300 actually does the data changing. Line 1700 just prints the data upon its exit from the subroutine at 300 so you can see that the subroutine really works.

Lines 300 to 395 contain the subroutine that allows the operator to change data in the screen box displayed by the subroutines at 200 and 400. Line 310 initializes the subroutine by setting the box position pointer (BP) to position one. This pointer is used to keep track of the cursor position within the box. Line 320 is the same as line 410: it sets the POKE color position to the first spot in the box. Line 325 is the same as line 212 and it does the same thing for the position of the next character. Line 330 creates a flashing cursor so that you will know where you are in the box. The cursor is made to flash by alternately POKEing two different colors into POKE position PP. The GET Z\$:IF Z\$=" " THEN 330 causes the program to wait for a key to be touched. Once a key is touched, control drops down to line 335 and the ASCII number of the character gotten by the GET statement is returned into numeric variable Z. Now that the character gotten in line 330 has been converted to an ASCII number, it can be evaluated and POKed to the screen or rejected.

Line 340 is actually the exit

from the subroutine. The RETURN key has an ASCII value of 13 and the HOME key has a value of 19 (see Appendix F of the 64 owner's manual). Pressing either key causes you to exit the subroutine. Using two different exit keys allows you to exit forwards or backwards from the box by having the exit key value carried out of the box in numeric variable Z. If you test for the value of Z when exiting from a box, you can tell the program what to do next (see lines 3430 and 3450). When this is done, BC=CC causes the subroutine at 400 to POKE the desired exiting color into the box in lieu of the highlighted color that was used to let you know that you were in the box. The subroutine at 600 feeds the data in the box back into memory. This will be discussed below.

If you have pressed some key other than RETURN or HOME, then line 345 checks to see if you touched the CURSOR LEFT key (ASCII value = 157) or the DELETE key — used as a backspace key (value = 19). If you did and the box position point (BP) is not at the left side of the box (position one), then the counters that are keeping track of the POKE color position (PC), the POKE position (PP) and the box position pointer (BP) are de-incremented and control goes back to line 330 where the cursor will now flash one position to the left of where it was before.

If you didn't touch the CURSOR LEFT or BACKSPACE keys then line 350 checks to see if you touched the CURSOR RIGHT key. If you did and there is room to move right then the cursor moves right and control goes back to line 330 to await another keystroke. If you didn't touch one of these, then line 360 checks for commas and colons and converts them to a graphics character that resembles a comma and then it skips over the rest of the character tests. The commas and colons are weeded

out so that if you file your data to the disk drive (or to a tape recorder) and try to retrieve it with an INPUT# statement, then the INPUT# won't be fooled by the comma or colon into thinking that it has reached the end of the variable that it is trying to input. Line 365 converts leading quotation marks into apostrophes for a similar reason: if left at the beginning of the variable, then the disk drive will delete all of the quotation marks from your variable. It is better to have the program screen out these undesirable characters than to forget to do it yourself one day.

Line 370 weeds out undesirable characters. Line 375 converts the ASCII numbers of any letters and certain typing symbols down to their POKE numbers. If you look at Appendices E and F of the owner's manual, you will see that the character-set-one POKes for letters are exactly 64 numbers lower than their corresponding ASCII numbers. Line 380 converts the POKE numbers to their reverse image numbers. Some limitation such as that in line 370 is necessary so that you don't end up trying to POKE a number greater than 255, since this would cause the program to crash with an error message.

Line 380 reverses the image and 390 POKes the reversed image character into the current cursor position PP and then if there is room left in the box (i.e., if the box position pointer BP is pointing to a position at least one spot to the left of the end of the box BL), it increments the position counters. Line 395 recycles the program back to line 330 to GET another keystroke.

Once the RETURN or HOME key is touched, line 340 calls the subroutine at 400 to put the exit color in the box and then it calls the subroutine at 600 to feed the data in the box into memory as string variable Z\$. Line 610 positions the PEEK position at the start of the

box, just as in lines 212 and 325. Line 615 clears out variables Z\$ and Z1\$. Line 620 starts a FOR/NEXT loop that is as long as the box is and at each spot in the box it PEEKs at the screen to see what character is in the spot. PEEKing is different from POKEing, looking instead of putting.

Line 625 is the reverse of line 380; it un-reverses the characters. Line 630 is the reverse of line 375. It converts PEEK and POKE numbers of letters and certain typing characters up into their ASCII numbers. Line 635 converts one character PEEK number located in Y and PEEKed at line 620 into its printable string variable character equivalent. Line 640 then adds this character to the end of string variable Z\$.

Line 650 starts a FOR/NEXT loop that is the length of Z\$. Line 655 then examines Z\$ character by character from end to beginning to find the last character that is not a space. Lines 665 and 670 then drop the leading and trailing spaces by setting Z\$ equal to the part of Z\$ that has non-space characters in it. This is done only to conserve memory. If you are

filing to a sequential file, then the extra spaces waste disk space. If you are filing to relative fields, you will not save disk space this way. In any event, you still conserve live memory by compressing out leading and trailing spaces. Line 675 pads any empty strings with a leading dash or hyphen. This is done to prevent disk filing errors that result from trying to retrieve empty variables. It also prevents errors that would occur if you use the LEFT\$, RIGHT\$, MID\$ or LEN functions on an empty string.

If you again change the GOTO in line 100, you can now try the multiple box illustration at line 3000.

Line 3200 sets three variables.

Lines 3300-3340 put them into three boxes by using the box displaying subroutine at 200. If the boxes were not the same length or color then this data would have to be specified for each box.

Lines 3400-3440 go from box to box asking for operator changes. Line 3410 sets flag F=1 so that line 355 will permit only numbers or decimal points to appear in this box. Line 355 could be used to screen for other charac-

teristics, too.

Lines 3430 and 3450 illustrate how the use of two exit keys can permit the operator to back up out of a screen box to another screen box. You can use backing up selectively and you can even use it to back up right out of a subroutine. Nothing is more annoying than a computer program that won't let you back up and try again.

If you are filing to the disk drive, as one might do when using relative files, then a filing subroutine might be called between each box. **Lines 3800-3820** just print out proof that the changes were really made.

An interesting project would be to write multiple boxes into your program with a method of using the up and down cursor keys or perhaps the function keys to move at will between the boxes. This would speed up operation of the program when you do not want to cycle sequentially through the boxes presented to you by the program. Adding a line before 340 might be a good place to cause an instant exit from a box without having to cycle through the box display routines.

Screen Box

```

10 REM "BOX 2" 03/04/84
15 REM PETER L. KNOX, ESQ.
20 REM SCITUATE SOFTWARE
25 REM 7 BISHOPS LANE
30 REM SCITUATE, MASSACHUSETTS
35 REM (617) 545-9267, 843-9225
40 REM BL = BOX LENGTH
45 REM BC = BOX COLOR
50 REM BP = BOX POSITION POINTER
55 REM CC = CHARACTER COLOR
60 REM PP = POKE OR PEEK CHARACTER
  POSITION
65 REM PC = POKE COLOR POSITION
70 REM R = ROW
75 REM C = COLUMN
80 REM Z = OUTPUT
85 REM F = FLAG; 1=NUMBERS ONLY
100 GOTO 3000 : REM 1000, 2000,
  OR 3000 DEPENDING ON ILLUSTRATION
200 REM SUBROUTINE TO DISPLAY SCREEN
  BOX DATA
210 IF Z$ = "" THEN Z$ = " "
  :REM PREVENTS ERRORS ON NULL
  STRINGS
212 PP=1024+(R*40)+C
215 X=LEN(Z$): IF X > BL THEN X=BL
220 FOR Y=1 TO X
225 Z=ASC(MID$(Z$,Y,1))
230 IF Z>63 THEN Z=Z-64
  :REM CONVERTS ASCII TO CHARACTER
  SET 1 POKES
235 Z=Z+128:REM CONVERTS TO REVERSE
  IMAGE POKES
240 POKE PP,Z:PP=PP+1:REM POKES &
  ADDS TO COUNTER
245 NEXT
250 IF X < BL THEN FOR PP=PP TO
  PP+BL-LEN(Z$)-1:POKE PP,160:NEXT
255 GOSUB 410 : REM ADDS BOX COLOR
260 RETURN
300 REM SUBROUTINE TO CHANGE SCREEN
  BOX DATA
310 BP=1:REM SETS POINTER TO 1
320 PC=55296+(R*40)+C
325 PP=1024+(R*40)+C
330 POKE PC,CC:GET Z$:POKE PC,BC
  :IF Z$=""THEN 330
332 IF Z$=""THEN 330

```



```

335 Z=ASC(Z$)
340 IF Z=13 OR Z=19 THEN BC=CC
      :GOSUB 410:GOSUB 610:RETURN
345 IF(Z=157 OR Z=20)AND BP>1 THEN
      PC=PC-1:PP=PP-1:BP=BP-1:GOTO 330
      :REM CURSOR LEFT
350 IF Z=29 AND BP<BL THEN PC=PC+1
      :PP=PP+1:BP=BP+1:GOTO 330
      :REM CURSOR RIGHT
355 IF F=1 THEN IF Z=47 OR Z < 46 OR
      Z > 57 THEN 330 :REM ACCEPTS ONLY
      #'S & "."
360 IF Z=44 OR Z=58 THEN Z=201
      :GOTO 390: REM CHANGES COMMAS AND
      COLONS
365 IF Z=34 AND BP=1 THEN Z=39
      : REM CHANGES LEADING QUOTES TO
      APOSTROPHES
370 IF Z < 32 OR Z > 95 THEN 330
      :REM WEEDS OUT UNDESIREABLE
      CHARACTERS
375 IF Z > 63 THEN Z=Z-64
      :REM CONVERTS ASCII TO CHARACTER
      SET 1 POKES
380 Z=Z+128:REM DISPLAYS IN REVERSE
      IMAGE
390 POKE PP,Z:IF BP<BL THEN BP=BP+1
      :PP=PP+1:PC=PC+1:REM POKES & ADDS
      TO COUNTERS
395 GOTO 330:REM RECYCLES - RETURN
      FROM THIS SUBROUTINE IS IN LINE 340
400 REM SUBROUTINE TO POKE COLOR INTO
      SCREEN COLOR MEMORY CELLS
410 PC=55296+(R*40)+C
420 FOR PC=PC TO PC+BL-1
430 POKE PC,BC
450 NEXT
460 RETURN
600 REM SUBROUTINE TO FEED DATA IN
      SCREEN BOX TO MEMORY
610 PP=1024+(R*40)+C
615 Z$="":Z1$=""
620 FOR PP=PP TO PP+BL-1: Y=PEEK (PP)
      :REM READS BOX CHARACTER BY
      CHARACTER
625 Y=Y-128:REM CONVERTS TO
      NON-REVERSE IMAGE POKES
630 IF Y < 32 THEN Y=Y+64
      :REM CONVERTS CHARACTER SET 1
      POKES TO ASCII
635 Z1$=CHR$(Y)
640 Z$=Z$+Z1$:REM ADDS CHARACTERS TO Z$
645 NEXT
650 FOR Y=LEN(Z$) TO 1 STEP -1
655 IF MID$(Z$,Y,1)<>" "THEN 665
660 NEXT
665 Z$=LEFT$(Z$,Y):REM DROPS TRAILING
      SPACES
670 IF LEFT$(Z$,1)=" "THEN
      Z$=RIGHT$(Z$,LEN(Z$)-1):GOTO 670
      : REM DROPS LEAD SPACES
675 IF Z$=""THEN Z$="-"
      :REM IF STRING IS EMPTY PADS WITH
      ONE HYPHEN
580 RETURN
1000 REM ILLUSTRATES OPERATOR
      CHANGING DATA IN SCREEN BOX
1100 PRINT CHR$(147):REM CLEARS SCREEN
1200 Z$="JANE" : REM Z$ CONTAINS DATA
      TO FEED INTO SCREEN BOX
1300 R=8:C=4:REM POSITIONS BOX AT ROW
      AND COLUMN
1400 BL=10:BC=1 :REM SETS BOX LENGTH
      AND COLOR
1500 GOSUB 210 : REM DISPLAYS DATA IN
      Z$
1600 CC=14:GOSUB 310:REM SETS END
      COLOR OF BOX AND ASKS FOR
      OPERATOR CHANGES
1700 PRINT Z$ :REM PRINTS OUT CHANGED
      DATA
1800 END
2000 REM ILLUSTRATES OPERATOR WARNING
      MESSAGE
2100 PRINT CHR$(147):REM CLEARS SCREEN
2200 Z$="TOUCH RETURN TO CONTINUE"
      :REM PUTS DATA INTO Z$
2300 R=8:C=4:REM POSITIONS BOX
2400 BL=24:BC=1 :REM SETS BOX LENGTH
      AND COLOR
2500 GOSUB 210 : REM DISPLAYS DATA IN
      BOX
2600 GET A$:IF A$ <> CHR$(13) THEN
2600:REM WAITS FOR RETURN KEY
2700 Z$=" ":BC=6:GOSUB 210
      :REM EMPTIES BOX
2800 END
3000 REM ILLUSTRATES OPERATOR
      CHANGING DATA IN SEVERAL SCREEN
      BOXES
3100 PRINT CHR$(147):REM CLEARS SCREEN
3200 A$="READY":B$="SET":C$="GO"
3300 Z$=A$:R=8 :C=4:BL=10:BC=14
      :GOSUB 210
3320 Z$=B$:R=10:C=24: GOSUB
      210
3340 Z$=C$:R=12:C=14: GOSUB
      210
3400 F=0 :REM SETS FLAG TO ACCEPT
      ANYTHING
3405 R=8: C=4:BL=10:BC=1:CC=14
      :GOSUB 410:GOSUB 310:A$=Z$
3410 F=1 :REM SETS FLAG TO ACCEPT
      ONLY NUMBERS AND DECIMAL POINTS
3420 R=10:C=24: BC=1
      : GOSUB 410:GOSUB 310:B$=Z$
3430 IF Z =19 THEN 3400
      :REM BACKS UP TO PRIOR BOX
3435 F=0 :REM RESETS FLAG TO ACCEPT
      ANYTHING
3440 R=12:C=14: BC=1
      : GOSUB 410:GOSUB 310:C$=Z$
3450 IF Z =19 THEN 3410
      :REM BACKS UP TO PRIOR BOX
3800 PRINT A$
3810 PRINT B$
3820 PRINT C$
3900 END

```

C

Memory Loader/Saver for the Commodore 64

By Bruce Jaeger

Loading and saving normal BASIC programs are easy on the Commodore 64, but the BASIC interpreter doesn't have any easy built-in ways to save other portions of memory to the disk. This short utility program allows easy loading and saving of the more popular areas (the cassette buffer, screen and color memories, etc.) and is called without any tricky poking or address calculations.

Calling the machine language routine is easy. First pick the area of memory to save from the following table:

0 \$033C	to	\$03FB	Cassette Buffer
1 \$0400	to	\$03EF	Screen Memory
2 \$07FB	to	\$07FF	Sprite Pointers
3 \$C000	to	\$C1FF	Common short ML Programs
4 \$C000	to	\$CFFF	
5 \$D800	to	\$DBFF	Color RAM
6 \$4000	to	\$7FFF	Common Hi-Res Area
7 \$C000	to	\$FFFF	Protected RAM Area
8 \$0000	to	\$FFFF	The Whole Thing!
9 \$CABC	to	\$CBAB	This Utility Program

Let's say your program creates a nice graphic display and you want to save that screen on the disk. Set S\$="SAVE1" (SAVE because we're saving and 1 because that's the number in the table for the screen memory). Then set N\$= the desired file name (how about PICTURE) and call the routine: SYS (51900),S\$,N\$. That's it!

Of course, for the example above, you'd also want to save the color RAM to reproduce the original graphics. Set S\$="SAVE5" and N\$="COLOR" (or whatever name you prefer) and call the routine again: SYS (51900),S\$,N\$.

To load a section of memory, just change the SAVE# to LOAD and set N\$ equal to the proper file name. (The number isn't necessary after LOAD.)

You don't have to use S\$ or N\$ as in the example above. Any string names will do, as long as they contain the correct information and are in the proper order.

For those who wish to customize this routine for their own purposes, the table of ten beginning and ending addresses starts at \$CB80 and is in the format Low Byte, High Byte (starting address) and Low Byte, High Byte (ending address).

```

100 REM MEMORY LOADER/SAVER
110 REM LOADER PROGRAM
120 :
2000 FORJ=51900TO52136:READA:POKEJ,A:NEXT J
2010 DATA 32,253,174,32,158,173,160,0
2020 DATA 177,71,200,177,71,133,253,200
2030 DATA 177,71,133,254,160,0,177,253
2040 DATA 141,122,203,201,76,240,17,160
2050 DATA 4,177,253,201,32,208,4,200
2060 DATA 76,221,202,105,207,141,123,203
2070 DATA 32,253,174,32,158,173,160,0
2080 DATA 177,71,141,124,203,200,177,71
2090 DATA 141,125,203,200,177,71,141,126
2100 DATA 203,169,13,32,211,255,169,13
2110 DATA 162,8,172,122,203,192,76,208
2120 DATA 5,160,1,76,28,203,160,255
2130 DATA 32,186,255,173,124,203,174,125
2140 DATA 203,172,126,203,32,189,255,173
2150 DATA 122,203,201,76,240,46,162,4
2160 DATA 169,0,141,127,203,173,127,203

```


2170 DATA 24,109,123,203,141,127,203,202	2240 DATA 169,13,32,211,255,96,76,5
2180 DATA 208,243,174,127,203,189,128,203	2250 DATA 8,150,10,20,60,3,251,3
2190 DATA 133,251,232,189,128,203,133,252	2260 DATA 0,4,231,7,248,7,255,7
2200 DATA 232,189,128,203,72,232,189,128	2270 DATA 0,192,255,193,0,192,255,207
2210 DATA 203,168,104,170,173,122,203,201	2280 DATA 0,216,255,219,0,64,255,127
2220 DATA 76,208,8,169,0,32,213,255	2290 DATA 0,192,255,255,0,0,255,255
2230 DATA 76,116,203,169,251,32,216,255	2300 DATA 188,202,168,203,247

100 REM MEMORY SAVER/LOADER	330 S\$="SAVE5":NAME\$="COLORRAM"
110 REM DEMO PROGRAM	340 SYS (51900),S\$,NAME\$
120 REM (ASSUMES ML PROGRAM IN MEMORY)	350 :
130 :	360 REM NOW CLEAR THE SCREEN, AND
140 REM SAVES THE SCREEN,	370 REM LOAD WHAT WE JUST SAVED.
150 REM THEN THE COLOR MEMORY.	380 :
160 :	390 PRINT CHR\$(147)
170 REM (YOUR OWN FANCY GRAPHICS	400 S\$="LOAD1":NAME\$="SCREEN"
180 REM WOULD BE HERE)	410 SYS (51900),S\$,NAME\$
190 :	420 S\$="LOAD5":NAME\$="COLORRAM"
200 PRINTCHR\$(147):POKE53262,21	430 SYS (51900),S\$,NAME\$
210 POKE53280,0:POKE53281,0	440 :
220 FORX=1TO200	450 PRINT CHR\$(19)CHR\$(18)"PRESS ANY KEY"
230 : R=INT(RND(1)*1000)+1	460 WAIT 198,1 : GETA\$: END
240 : C=INT(RND(1)*16)	
250 : K=INT(RND(1)*128)+127	
260 : POKE 1024+R,K	
270 : POKE 55296+R,C	
280 NEXTX	
290 :	
300 S\$="SAVE1":NAME\$="SCREEN"	
310 SYS (51900),S\$,NAME\$	
320 :	

LINE#	LOC	CODE	LINE
00056	CB1A	A0 FF	SASET LDY #\$FF ; NO SEC. ADDRESS FOR SAVES
00057	CB1C	20 BA FF	SECSKP JSR SETLFS ; KERNAL ROUTINE
00058	CB1F	AD 7C CB	LDA NMLEN ; FOR KERNAL SETNAM
00059	CB22	AE 7D CB	LDX NAMELO ; FILENAME LOW BYTE
00060	CB25	AC 7E CB	LDY NAMEHI ; HIGH BYTE
00061	CB28	20 BD FF	JSR SETNAM ; KERNAL ROUTINE
00062	CB2B	AD 7A CB	LDA DECIDE
00063	CB2E	C9 4C	CMP #76 ; LOAD?
00064	CB30	F0 2E	BEQ NONUMS ; NOT NECESSARY FOR LOADS
00065	CB32	A2 04	LDX #04 ; MULTIPLIER
00066	CB34	A9 00	LDA #00
00067	CB36	8D 7F CB	STA INDEX ; ZERO INDEX
00068	CB39	AD 7F CB	LOOP LDA INDEX ; MULTIPLIES BY 4
00069	CB3C	18	CLC ; TO GET THE CORRECT
00070	CB3D	6D 7B CB	ADC AREA ; INDEX INTO THE ADDRESS
00071	CB40	8D 7F CB	STA INDEX ; TABLE
00072	CB43	CA	DEX
00073	CB44	D0 F3	BNE LOOP
00074	CB46	AE 7F CB	LDX INDEX
00075	CB49	BD 80 CB	LDA TABLE,X ; GET START ADDRESS LOW BYTE
00076	CB4C	85 FB	STA \$FB
00077	CB4E	E8	INX
00078	CB4F	BD 80 CB	LDA TABLE,X ; GET START ADDRESS HIGH BYTE
00079	CB52	85 FC	STA \$FC
00080	CB54	E8	INX
00081	CB55	BD 80 CB	LDA TABLE,X ; GET END ADDRESS LOW BYTE
00082	CB58	48	PHA ; SAVE IT ON STACK
00083	CB59	E8	INX
00084	CB5A	BD 80 CB	LDA TABLE,X ; GET END ADDRESS HIGH BYTE
00085	CB5D	A8	TAY ; PUT IT IN Y INDEX
00086	CB5E	68	PLA ; RETRIEVE THE LOW BYTE
00087	CB5F	AA	TAX ; PUT IT IN X INDEX
00088	CB60	AD 7A CB	NONUMS LDA DECIDE
00089	CB63	C9 4C	CMP #76 ; LOAD?
00090	CB65	D0 08	BNE LDSKIP ; NO, GO TO SAVE
00091	CB67	A9 00	LDA #00
00092	CB69	20 D5 FF	JSR LOAD ; KERNAL ROUTINE
00093	CB6C	4C 74 CB	JMP DONE
00094	CB6F	A9 FB	LDSKIP LDA #\$FB ; LOW BYTE LOCATION
00095	CB71	20 D8 FF	JSR SAVE ; KERNAL ROUTINE
00096	CB74	A9 0D	DONE LDA #13 ; FILE ###
00097	CB76	20 D3 FF	JSR CLOSE ; KERNAL ROUTINE
00098	CB79	60	RTS
00099	CB7A		; VARIABLES *****
00100	CB7A		DECIDE *=*+1
00101	CB7B		AREA *=*+1
00102	CB7C		NMLEN *=*+1
00103	CB7D		NAMELO *=*+1
00104	CB7E		NAMEHI *=*+1
00105	CB7F		INDEX *=*+1
00106	CB80		TABLE ; *****
00107	CB80	3C 03	.WORD \$033C, \$03FB ; "0" CASSETTE BUFFER
00108	CB82	FB 03	
00109	CB84	00 04	.WORD \$0400, \$07E7 ; "1" SCREEN
00110	CB86	E7 07	


```

PASS2
000001 0000      COMMA = $AEFD      ; ROM ROUTINE
000002 0000      EVAL  = $AD9E      ; ROM ROUTINE
000003 0000      DCZLO = $00FD      ; START OF STRING
000004 0000      DCZHI = $00FE
000005 0000      PTR   = $0047
000006 0000      SETLFS = $FFBA      ; KERNAL ROUTINE
000007 0000      SETNAM = $FFBD      ; KERNAL ROUTINE
000008 0000      SAVE  = $FFD8      ; KERNAL ROUTINE
000009 0000      LOAD  = $FFD5      ; KERNAL ROUTINE
000010 0000      CLOSE = $FFD3      ; KERNAL ROUTINE
000011 0000      *=$CABC      ; START AT $CABC (51900 DECIMAL)
000012 CABC 20 FD AE      JSR      COMMA      ; FIND COMMA
000013 CABF 20 9E AD      JSR      EVAL      ; EVALUATE EXPRESSION
000014 CAC2 A0 00      LDY      #00
000015 CAC4 B1 47      LDA      (PTR),Y      ; GET LENGTH OF STRING
000016 CAC6 C8      INY
000017 CAC7 B1 47      LDA      (PTR),Y      ; GET START OF STRING
000018 CAC9 85 FD      STA      DCZLO      ; (LOW BYTE)
000019 CACB C8      INY
000020 CACC B1 47      LDA      (PTR),Y      ; (HIGH BYTE)
000021 CACE 85 FE      STA      DCZHI
000022 CAD0 A0 00      LDY      #00
000023 CAD2 B1 FD      LDA      (DCZLO),Y      ; GET FIRST CHARACTER
000024 CAD4 8D 7A CB      STA      DECIDE      ; SAVE IT FOR LATER
000025 CAD7 C9 4C      CMP      #76      ; AN L?
000026 CAD9 F0 11      BEQ      GETNAM
000027 CADB A0 04      LDY      #4
000028 CADD B1 FD      GETCH  LDA (DCZLO),Y      ; GET SECOND CHARACTER
000029 CADF C9 20      CMP      #32      ; A SPACE?
000030 CAE1 D0 04      BNE      NOSPC      ; SKIP OVER SPACE ROUTINE
000031 CAE3 C8      INY
000032 CAE4 4C DD CA      JMP      GETCH
000033 CAE7 69 CF      NOSPC  ADC #207      ; OFFSET FROM ASCII
000034 CAE9 8D 7B CB      STA      AREA      ; MEMORY AREA TO SAVE
000035 CAEC 20 FD AE      GETNAM JSR COMMA      ; FIND COMMA
000036 CAEF 20 9E AD      JSR      EVAL      ; EVALUATE EXPRESSION
000037 CAF2 A0 00      LDY      #00
000038 CAF4 B1 47      LDA      (PTR),Y      ; GET LENGTH OF NAME STRING
000039 CAF6 8D 7C CB      STA      NMLEN      ; SAVE IT
000040 CAF9 C8      INY
000041 CAFA B1 47      LDA      (PTR),Y      ; GET START OF STRING
000042 CAFD 8D 7D CB      STA      NAMELO      ; (LOW BYTE)
000043 CAFF C8      INY
000044 CB00 B1 47      LDA      (PTR),Y      ; (HIGH BYTE)
000045 CB02 8D 7E CB      STA      NAMEHI

000047 CB05 A9 0D      LDA      #13      ; FOR FILE 13
000048 CB07 20 D3 FF      JSR      CLOSE      ; CLOSE FILE 13
000049 CB0A A9 0D      LDA      #13      ; FILE ###
000050 CB0C A2 08      LDX      #08      ; DEVICE ###
000051 CB0E AC 7A CB      LDY      DECIDE
000052 CB11 C0 4C      CPY      #76      ; L FOR LOAD?
000053 CB13 D0 05      BNE      SASET      ; NO, SKIP SECONDARY ADDRESS
000054 CB15 A0 01      LDY      #01      ; SET SECONDARY ADDRESS=1
000055 CB17 4C 1C CB      JMP      SECSKP

```


MEM.S.....PAGE 0003

LINE#	LOC	CODE	LINE
00109	CB88	F8 07	.WORD \$07F8, \$07FF ; "2" SPRITE POINTERS
00109	CB8A	FF 07	
00110	CB8C	00 C0	.WORD \$C000, \$C1FF ; "3" COMMON ML PRGS
00110	CB8E	FF C1	
00111	CB90	00 C0	.WORD \$C000, \$CFFF ; "4"
00111	CB92	FF CF	
00112	CB94	00 D8	.WORD \$D800, \$DBFF ; "5" COLOR RAM
00112	CB96	FF DB	
00113	CB98	00 40	.WORD \$4000, \$7FFF ; "6" COMMON HI-RES AREA
00113	CB9A	FF 7F	
00114	CB9C	00 C0	.WORD \$C000, \$FFFF ; "7"
00114	CB9E	FF FF	
00115	CBA0	00 00	.WORD \$0000, \$FFFF ; "8" THE WHOLE THING!
00115	CBA2	FF FF	
00116	CBA4	BC CA	.WORD \$CABC, \$CBAB ; "9" THIS PROGRAM
00116	CBA6	AB CB	
00117	CBA8		.END

ERRORS = 00000

SYMBOL TABLE

SYMBOL VALUE

AREA	CB7B	CLOSE	FFD3	COMMA	AEFD	DCZHI	00FE
DCZLO	00FD	DECIDE	CB7A	DONE	CB74	EVAL	AD9E
GETCH	CADD	GETNAM	CAEC	INDEX	CB7F	LDSKIP	CB6F
LOAD	FFD5	LOOP	CB39	NAMEHI	CB7E	NAMELO	CB7D
NMLEN	CB7C	NONUMS	CB60	NOSPC	CAE7	PTR	0047
SASET	CB1A	SAVE	FFD8	SECSKP	CB1C	SETLFS	FFBA
SETNAM	FFBD	TABLE	CB80				

END OF ASSEMBLY

READY.

C

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Appending Machine Code Routines to Your BASIC Programs on the Commodore 64

By Roger S. Macomber

Often, during the composition of a large BASIC program, it becomes desirable to write sections of the program in machine language and append them to the main program. Such appended subroutines can then be accessed by a SYS command.

Once the machine coded subroutine has been written and debugged using an assembly language monitor, the question is how to best transfer the sequence of bytes into the BASIC program. One technique involves the temporary addition of a short set of instructions in the BASIC program which allows the machine code to be entered manually byte by byte and poked into the appropriate space reserved at the end of the BASIC program. For even relatively short subroutines of 100 bytes or so, this can be a tedious, error-filled exercise. For longer subroutines, it can be all but impossible. The technique described below greatly facilitates error-free transfer of a machine coded routine of N bytes from your assembly language monitor to an existing BASIC program.

To prepare the BASIC program, make sure it has space for six temporary instructions at its beginning. Run your assembly monitor, assemble the machine coded subroutine and check that it ends with an RTS command (decimal 96) as the Nth byte. Note the memory address of the first instruction of the sequence. When using *Supermon*, for example, I always use location \$1300 (decimal 4864) to

begin a machine code routine. Next, exit the monitor and return to BASIC without disturbing the subroutine. (With *Supermon* the appropriate command is "X") Now LOAD and RUN the program below which you've previously stored on disk:

Appending 1

```
10 REM WRITE MACHINE
   CODE ON DISK
20 PRINT"INSERT DISK"
25 INPUT"ENTER FILE
   NAME";FF$
30 INPUT"ENTER NUMBER
   OF BYTES";N
40 OPEN 8,8,8,"@@"+"FF$
   "+",S,W"
50 FOR I=4864 TO 4863+N
60 PRINT#8,PEEK(I):
   PRINT PEEK(I);:NEXT
70 PRINT#8:CLOSE 8:END
```

After you enter a file name and the number of bytes, the machine code sequence will be stored on disk and printed on the screen.

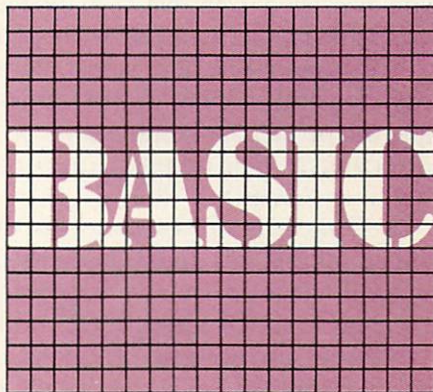
The next step is to reset the computer with a SYS 64759 command and to load the BASIC program to which the subroutine will be appended. By peeking in locations 45 and 46, determine the location of the end of the BASIC program and poke in a value N bytes greater. For example, if the contents of 45 and 46 are 223 and 9 (pointing to location 2527) and N is 105, POKE 72 and 10 (pointing to 2632) into 45 and 46. This reserves a block of space for the N bytes of machine code which will

become a permanent part of the BASIC program. Now add the following temporary instructions to your BASIC program, using the numerical value of N:

Appending 2

```
2 S1=256*PEEK(46)+PEEK
  (45)-N
3 INPUT"INSERT DISK:
  ENTER FILE NAME";FF$
4 OPEN 8,8,8,"@"+"FF$+"
  ",S,R"
5 FOR I=0 TO N-1:INPUT#
  8,BT
6 POKE S1+I,BT:PRINT BT
  :NEXT
7 CLOSE 8:STOP
```

To complete the transfer, run the BASIC program and enter the same file name you used when you wrote the file on disk. When the transfer is complete, delete instructions three through seven, but retain two. Finally, wherever in the BASIC program you wish to call the newly appended subroutine, add the instruction SYS S1. And don't forget to save the resulting program! **C**



Line Formatting

By Joe Rotello

As users or programmers, we have all had a need for some form of neatly organized video screen or printer output so we could display our data or combined string/numeric output on the same line.

There are presently a variety of methods to do this, some being hardware-based (i.e., those computers capable of using PRINT USING commands) and some software-based. Situations might arise where you have a Commodore computer that will output to a printer that may or may not be a CBM brand printer.

We know that CBM printers offer line formatting via special printer addresses and the like. So, how do we allow the creation of formatted lines on a non-Commodore printer?

Our second situation is where we have to display a formatted line both to the CBM video screen and to the CBM printer. OK, most of us say "easy to do", but really, is it? (True, it depends on one's definition of easy.)

We can format to the CBM video by using TAB, SPC and the like, but when we try to send the same data to the printer, both CBM and non-CBM printers have troubles accepting the data exactly as received. It sometimes ends up looking bad and takes extra programming to format one way for the video display and then go out and format another way for the printer.

CBM dot matrix printers have their own formatting directives and commands and do make the job of printer formatting much easier. But, again, have you ever tried to format *both* the PET/CBM video and CBM printer with the *same* program lines?

The bottom line here is that there must be a fairly easy, fast and efficient way to format both the video and the printer at the same time, so that by simply directing the data output to one or the other, formatted lines results.

Well, there is an easier way that does cover most situations and this method is fairly failsafe. If you do not follow the few rules somewhat closely, you may run into a bit of trouble, but it's nothing too major.

What we are going to do is format the data *in memory* rather than in the printer. In this method,

the following features are available:

1. The format lines are, in general, the same for both the video screen and the printer.
2. Format commands are merely exercises in string management utilizing LEFT\$, RIGHT\$ and so on.
3. Format lines can be implemented in BASIC and tailored to 40- or 80-column widths.
4. Left-justify alphanumeric strings and right-justify numeric strings. We will discuss this in detail later on.
5. The format commands are quick to operate, easy to understand once you know what they do and do not involve overly-complicated BASIC source code.

As you can see, not a panacea for all of our programming ills, but nonetheless a step in the right direction.

The program outlined here is somewhat "instructional" in nature and you can build on it for your own uses. Our example program contains some extras that you probably will not use in your version. We used them in order to make our sample video display a little more readable.

What We do

As you may have gathered, what we are doing is formatting or padding our data by inserting spaces at the appropriate points so that regardless of the actual length of the incoming (or raw) data, the data (after formatting) is always transformed into equal string lengths.

Once we have equal string lengths, it becomes an easy task to place them on a common line, arrange them in the desired order and print them. Since we are actually formatting our data *in memory* and without TAB, SPC or other commands, the same formatted string can be used in *both* video screen displays and the printer hard copy.

OK, let's define two rules. As mentioned above, alphanumeric data, which could be such data as name, address, city or state (or any similar data) should be left-justified, that is, the left side of

the data lines up flush with the first logical printing column.

Conversely, numeric data, say dollars/cents as in \$123.45 or an integer as in 9100, will be right-justified. In that manner, any decimal points line up towards the right hand of the data or flush right.

After formatting our data, we can vary where we want it to print on the output line simply by inserting spaces (spaces are preferred even though they use up more memory) into the line PRINT commands, between the actual formatted data. We do discourage the use of the TAB function. For example, when formatting don't say:

```
PRINT NAME$;MEMBER$;TAB(55);AMOUNT$
Instead say:
PRINT NAME$;"[20 spaces]";MEMBER$;"
          [15 spaces]";AMOUNT$
```

You could TAB at the start of our formatted line, even if the format is intended for the printer. Just do not TAB anywhere else. In fact, use spaces instead. Some non-CBM printers will not understand the TAB statement correctly anyway.

By the way, our program comments and REMS are there just to make the description of the process a little simpler. Feel free to experiment on your own and fit the concepts to your programming needs. You may even wish to justify different data in a different manner. Each situation may be different than the one we present here.

The program was intended for our 8032 (80-column) CBM, but you can modify it for 40-column work by making the appropriate changes. We will note them later on in our discussion.

A situation you will run into on 40-column video work is that the printer output will usually be 80 columns in nature. So, you will have to sometimes write two formatted lines into your program. One line to send the 40-column formatted data to the screen and the second to send 80-column formatted data to the printer. You might want to set up some code where the output device address (3 = video, 4 = printer) is selected and the appropriate format routine called.

Numbers and Spaces

The rule of thumb in setting up the format lines themselves is shown in line 220 of the example program. We intend the maximum length of the data to be formatted to be 25 characters. So, code in 25 spaces (as we did) and the last numeric argument of the routine will be 25. This same logic can be seen in lines 260 and 290, regardless of whether the data is to be left- or right-justified. In fact, the difference between left and right justification will be the placement of the spaces. Left justification involves

padding to the right of the data and right justification involves padding to the left of the data.

Let's go over the example program line by line:

- Line 60** Clears the video screen, defines xz\$ as our cursor movement string and sets K, our loop flag, to an initial value of one.
- Line 70** Build CL\$, our column number display, to a length of 80 characters. For 40-column screens, change the code from "FOR I = 1 to 8" to "FOR I = 1 to 4" and the column display will build to 40 columns.
- Lines 90-130** Allow the user to select the video screen or printer as the output device (3=screen, 4=printer) and open the channel to the selected device.
- Line 150** Begins our data entry loop, starting off with NAME\$.
- Line 160** Checks the NAME\$ just entered and if the user enters END as the NAME\$, closes the device channel and ends the program execution. If not, the program continues on.
- Lines 170-180** Continue the data input loop.
- Line 220** Left-justifies the NAME\$ so that any length string in the range of one to 25 characters long is padded to the right with the required number of spaces (or blanks). In this manner, the end result NAME\$ is always the same length.
- Line 260** Very much the same logic is applied here. But since we want to right-justify the numeric variable (our example assumes dollars/cents input) format, we now reverse our logic and pad the required number of spaces to the beginning of the incoming (raw) AMOUNT\$ and right-justify the end result (outgoing) AMOUNT\$.
- Line 290** Armed with the above knowledge, the treatment of MEMBER\$ should now be self-explanatory.
- Line 320** Checks to see if the example screen column display has already been printed. If so, skip to line 400.
- Lines 350-370** Print the screen column display. For 40-column displays, end the display print with "40" instead of the "80" shown.
- Line 400** Moves the cursor to the proper location on the screen and allows us to stack up our example listings in a neat, orderly manner so we can see the action of our line formatter over various inputs. Most

printers will properly ignore this code so there is no need to treat the printer differently in this case.

Lines 450, 480, 500 Three example ways to print the newly formatted data. Remove the REM statement from the line you would like to try out. Note the use of the TAB statement in line 480, along with eight spaces printed between the data instead of ten spaces.

Line Formatter

```

10 REM    LINE FORMATTER
20 :
30 REM    "[SHFT N,SHFT O,SHFT T,
SHFT E]: PRINTERS WILL IGNORE
40 REM    CODE IN LINE 400
50 :
60 PRINT"[CLEAR]":XZ$="[DOWN10]":K=1
70 FOR I=1 TO 8:CL$=CL$+"1234567890"
:NEXT
80 :
90 PRINT"[SHFT O]UTPUT TO
: [RVS,SHFT V,RVOFF]IDEO OR [RVS,
SHFT P,RVOFF]RINTER ? ";
100 GET AS:IF AS<>"V"AND AS<>"P"THEN
100
110 IF AS="V"THEN X=3
120 IF AS="P"THEN X=4
130 OPEN 4,X
140 :
150 INPUT"[HOME,DOWN3]NAME
:[SPACE5]";NAME$
160 IF LEFT$(NAME$,?)="END" THEN
PRINT#4:CLOSE 4:PRINT"[CLEAR]":END
170 INPUT"AMOUNT[SPACE2]:";AMOUNT$
180 INPUT"MEMBER #:";MEMBER$
190 :
200 REM    FORMAT 25 CHR MAX STRING
210 REM    LEFT JUSTIFY PADS RIGHT OF
THE STRING
220 NAME$=LEFT$(NAME$+"[SPACE25]",25)
230 :
240 REM    FORMAT 9 CHR MAX STRING
250 REM    RIGHT JUSTIFY PADS LEFT OF
THE STRING
260 AMOUNT$=RIGHT$("[SPACE9]"+AMOUNT$,
9)
270 :

```

Line 530 Increments the video screen counter and goes back for another data entry run.

Taps

Well, so goes the Line Formatter. It is deceptively simple and does save a lot of time, especially for those blessed with an 80-column CBM and any printer that I can think of, be it CBM or not.

I have used the above approach on just about every program I do and have yet to see where it might fail to perform as advertised.

```

280 REM    FORMAT 3 CHR MAX STRING
290 MEMBER$=LEFT$(MEMBER$+"[SPACE3]",
3)
300 :
310 REM    SCREEN CONTROL FLAG FOR
EXAMPLE PRG ONLY
320 IF K>1 THEN 400
330 :
340 REM    PRINT COLUMN SCALE
350 PRINT"[SPACE9]1[SPACE9]2[SPACE9]3
[SPACE9]4[SPACE9]5[SPACE9]6";
360 PRINT"[SPACE9]7[SPACE9]8"
370 PRINT"[UP]";CL$
380 :
390 REM    VIDEO SCREEN CURSOR CONTROL
FOR TESTING
400 PRINT"[HOME,DOWN5]"
:PRINT LEFT$(XZ$,K)
410 :
420 REM    PRINT DATA IN ANY ORDER,
INSERT SPACES WHERE NEEDED
430 REM    EXAMPLE PRINT 10 SPACES
BETWEEN DATA
440 :
450 REM    PRINT#4,MEMBER$;"[SPACE10]";
NAME$;"[SPACE10]";AMOUNT$
460 :
470 REM    OTHER COMBINATIONS YOU CAN TRY
480 REM    PRINT#4,TAB(20);AMOUNT$;"
[SPACE8]";NAME$;"[SPACE8]";MEMBER$
490 :
500 REM    PRINT#4,NAME$;"[SPACE10]";
AMOUNT$;"[SPACE10]";MEMBER$
510 :
520 REM    INCREMENT VIDEO COUNTER AND
CONTINUE
530 K=K+1:GOTO 150

```

C

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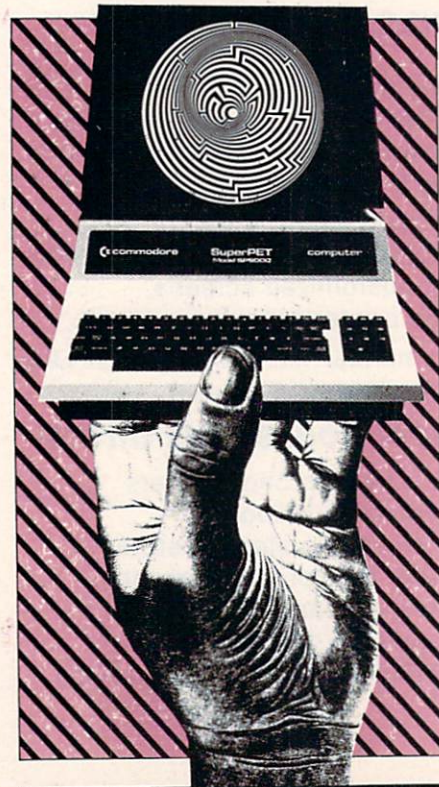
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SuperPET Potpourri

By Dick Barnes

When first you encounter SuperPET's languages, you must learn how to leave nested loops. You also must cope with the external switches on SuperPET. A lot of my mail asks about both. Maybe the answers below will help.

Some of you tell me that structured programs are a bushel of bother to write ("Gee, you draw flow diagrams for a week. *Then* you write a page of code.") Some books and some teachers indeed handle it that way; structure itself becomes a straightjacket and a fetish. I won't and don't. Structure is a tool not an end in itself and though many of us find structured code simpler and easier to write than unstructured code, others find it hard and slow.



In SuperPET we have the best of both worlds. We can write mFORTRAN, mBASIC and 6809 assembly language programs as we wish. If we like structure, we have it; if not, it isn't demanded. Those who program in assembly language should read Listing 1, which compares SuperPET's structured assembly language with unvarnished 6809 mnemonic code. Which do you prefer? SuperPET's assembler accepts code both ways.

Last, good news. You may now print APL from SuperPET to a Commodore 8023, or to FX and

MX Epson printers (see sample character set, Listing 2) thanks to Steve Zeller of Washington, D.C., Reginald Beck of Williams Lake, B.C., and to Delton P. Richardson of Norcross, Georgia, who developed the methods and have made them available to everyone.

Dealing with Loops

Though jumping out of a FOR...NEXT loop before it's finished is a no-no in Commodore BASIC, you can leave *any* loop in mBASIC and mFORTRAN at will, with one or many tests for specific EXIT conditions. In Example 1, we "input" a whole line at a time from an index on drive zero and quit the FOR...NEXT loop either at end-of-file or at "blocks free." If you don't like structure or indentation, write it with GOTOs—which are, however, often slower than FOR...NEXT loops, which are by far the fastest of all loop structures. (To make examples clear, I use no line numbers and indicate deleted, irrelevant code with "...". Italics emphasize important lines; "!" sets off a comment.)



Dick Barnes

Example 1

```
loop
  for i = 1 to 255
    linput #30, directory$(i)
    if io status <> 0 then quit
    if idx(directory$(i), "BLOCKS FREE") then quit
  next i
  ...process the strings
  ... ! how do you quit the outer loop?
endloop ! Outer loop prints several files in one
run.
```


The DO loops of mFORTRAN you leave with "quitif <condition>"; loops in structured assembly language, with "quif <condition>". Whatever the language, your program then executes the first line of code after the end of loop (above, the line following "next i"). Frequently you must set *flags* to get fully clear of

nested loops, as in the example above, where we want to quit the outer loop as soon as we've processed the last string from disk. So we set a *flag* in the FOR... NEXT loop and depart both inner and outer loops if that flag has value, as in Example 2 (variable "lastfile" decrements as several files are printed).

Example 2

```
loop
  for...
    linput #30, directory$(i)
    if io status <> 0 then flag=1
    if idx(directory$, "BLOCKS FREE") then flag=1
    if flag then quit
  next...
  if lastfile=>1 then flag=0
  ...process the strings
  if flag then quit
endloop
```

You'll often find you need two or three flags (flag1, flag2, flag3, etc.) to leave nested loops where and when you want. Flags are powerful and simple to use.

A Detour

Are you puzzled by the "idx" and horrified by the "directory\$" above? Let's detour to "idx" first. It reports where a substring starts within a larger string. If *where\$ = #April Showers*, then *idx (where\$, "Showers")*, equals seven — the number of characters from start-of-string to the "S". Sometimes — as in the examples above — we don't care where the substring is, but only wonder if it's

there at all. If it's not, "idx" reports a big fat zero and an "if idx..." then fails. Function "index" in mFORTRAN works the same way.

Suppose we want to mail form letters with a personal "Dear Mrs. Jones" to everybody on our mailing list — except (whoops!) to the name of a firm. "Dear Bailey Bars and Bolts:" for example, accuses Bailey of bolting. And we know that doctors and other professionals often are proud of their titles. Inevitably we must screen our mail list. Shown in Example 3 is a small part of a such a screen, using "idx" (for clarity, I don't bother with the last name).

Example 3

```
loop
  ...
  data "Mr.", "Ms.", "Mrs.", "Miss "
  for j%=1 to 4
    read person$
    if idx(mailist$, person$)
```

(Continued On Next Page)

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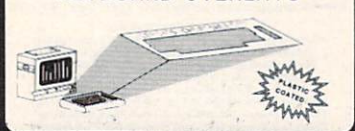
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Example 3 (continued)

```
salutation$="Dear "+person$
flag=1
endif
if flag then quit
next j%
restore
if flag ! Quit "if" structure
quit ! on Mr., Ms., etc.
elseif idx(mailist$, 'Dr.') or idx(mailist$, 'M.D.')
salutation$="Dear Doctor: "
elseif idx(mailist$, 'Rev.') or idx(mailist$, 'Reverend')
salutation$="Dear Reverend: "
...! and so forth for Ph.D's, Brothers, Friars, etc.
...! until we default, at "Bailey Bars and Bolts", to:
else
salutation$="Dear Client: "
endif
... ! We jump here on the 'if flag' quit.
...
endloop
```

After you get used to "idx" or "index" you'll find more and more uses for the functions. Both are very powerful and very fast.

And indeed I use the reserved word "directory" in Examples 1 and 2. Not only may you do this, you may use "forbid" as a name for a numeric variable, despite the "for" in it, since SuperPET languages don't store a variable name in the line—but instead store a *pointer* to the variable name. That's why variable names 31 characters long run just as fast as names of one character—and why the interpreters for mBASIC, mFORTRAN and mPASCAL don't hiccup when a reserved word forms part of a variable name. You

can nudge reserved words just a tetch, to become "sstop", "prinnt", "endd", etc., or by adding "\$" in mBASIC. When you want to PRINNT something, or to mark the ENDD of something else, your variable name can clearly say so.

End of the Detour

Back to structure. You may not only jump out of all loops with a "quit", but you may leave complex IF... THEN statements as well, as in Example 3 above. There, by first screening out the Mistfers and Mizzes, we avoid wading through the long list of less common titles. Since some of my mail asks just how IF... ELSEIF... ENDIF statements work, let's take a look:

```
if x=2
! do thus and so and quit
elseif x=3
! or do something else and quit
elseif x=4
! or do another thing and quit
else
! or do the default thing and quit
endif
```


Only one of the "if... elseif... else" clauses ever executes. When it does, the interpreter jumps to the line following "endif" — an automatic "quit." But as we see in Example 3, the "quit" sometimes helps you skip big chunks of code. Note that you may have as many "elseifs" as you wish and that the default "else" is optional.

In sum, you may leave all loops and all IF... ENDIF structures with some form of "quit", supplemented by flags, in mBASIC, mFORTRAN and in SuperPET's assembly language.

Those Durn Switches

Low on the right side of SuperPET you'll find either two or four small toggle switches. If the first is set to RW (Read Write), you may read from or write to the 64K bytes of bank-switched memory. Set to READ, and you read only. In PRG you control RW from program. Switch two selects the microprocessor — either 6809 or 6502 — or if set to PRG gives control to the 6809 but will transfer it to the 6502 from program. Some early three-board SuperPETs may have switches three and four, which control ROM sockets used only in 6502 mode. If so...

For Early Models

Switch three controls socket UD12 on the lower board (address \$9000-9FFF) for programs such as POWER. If you want the socket in 6502, turn it on; in 6809 turn it off or you'll block the 64K of back-switched memory at \$9000.

Switch four controls socket UD11 (address \$A000-\$AFFF) usually used by word processing programs such as *WordPro*. Turn it off in 6809.

A few old three-board models have only two switches. You are in trouble *if* you install a chip in the \$9000-\$9FFF socket at UD12—for you then totally block any access to the upper 64K at \$9000. Solutions: 1) install a switch or 2) use a

simple BASIC program which unloads to disk any ROM at \$9000. Then take the ROM out. You thereafter load the ROM image in *any* of the switched banks and may call that bank (and program) on demand from 6502. It's a simple and elegant solution. Send me a self-addressed, stamped envelope at the address below, and I'll send the program written by Roy Busdiecker of Woodbridge, Virginia.

For New Models

How do you control those ROM sockets on new, two-board models with only two switches? With POKES. Commodore provides two new sockets on the front of the upper board, where it's easy to install ROMs. The \$A000-AFFF socket (the word processing hole) is at U46, always on in 6502 and always off in 6809. The \$9000-\$9FFF socket is at U45, always off until you POKÉ 61438,1 in Commodore BASIC. POKÉ zero there to turn it off—but *only* after you leave the program which uses that ROM (in POWER, you exit with OFF). If you don't EXIT you crash, for SuperPET is in the midst of a program which constantly refers to that ROM. Save a copy of the switch info above; the manuals say nothing about it.

MAT Statements

MicroBASIC possesses several new and powerful statements. The least familiar is the MAT statement. (MAT is short form for "matrix" or array.) If we have an array of a\$(1)="One" and a\$(2)="Two", then MAT a\$ (or mat a\$) is a two-element matrix composed of a\$(1) and a\$(2). You can manipulate such arrays value by value as in Commodore BASIC or as single entities with MAT.

As with arrays, you may employ up to, but not more than, ten matrix elements without a DIM. If you DIMension, DIM A\$ or A, not mat A or mat A. Whether or not you dimension, no element has value until you assign one, either as a single value [mat a\$=(CR\$)] or by transferring the value of another matrix [MAT A\$=NAME\$] of the same number of elements *if* both matrices are dimensioned. If they're not dimensioned, you have a powerful way to transfer one matrix to another even if they have a *different* number of elements. As an example, you might have many menus (say menu1\$ through menu20\$) in a complex program. If all menus are ten strings or less, you can pass any menu as a parameter (in parentheses) to a print procedure like this:

```
...
  call printt(mat menu2$)
...
  call printt(mat menu20$)
...
proc printt(mat what$)
  print mat what$;      ! Yes, semicolon. See below.
endproc
```


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And "mat what\$" always prints as the menu matrix you specify. It saves a *lot* of code and is fast, fast, fast.

Note well that you may assign new values to any single element of a matrix without disturbing the other elements by coding, for example a\$(7)="JONES", no matter what the value of the other elements.

You print matrices to screen with either "print mat a\$" or "mat print a\$", while to disk or printer opened as file #40 you use "print #40, mat a\$". With no semicolon (mat print a\$) values print in a 16-space print zone with automatic tabover. Add a semicolon (mat print a\$;) and string matrices print with no spaces between elements, positive numbers with a prefixed space and negative numbers with a sign and no spaces.

There's a trick to handling string

matrices. Add a carriage return (CR\$) to each element and that element will print to both screen and printer as a separate line. You may print a menu, a long list or even a complete letter with a *single* print statement instead of an explicit loop. And there's a second trick, widely useful. Example: names and addresses on mailing lists rarely fit into the same number of lines. After they're printed, you must space to the top of the next label either by setting your printer or by counting the lines. With MAT statements, there's an easy way: (1) DIM a matrix for top-to-top label spacing, (2) assign the whole matrix the value of a carriage return (CR\$) and (3) overwrite the matrix with the name and address. The CR strings which are not overwritten space you to the top of the next label, as below:

Original Matrix		Overwritten Matrix:	
Element:	Value:	Value:	
0	CR\$ 00003DUNDE*789411800.AUG85	+ CR\$	
1	CR\$ Homer Q. Dunderhead	+ CR\$	
2	CR\$ Box 789	+ CR\$	
3	CR\$ Someplace NC 00000	+ CR\$	
4	CR\$ CR\$ (not overwritten)		
5	CR\$ CR\$ (not overwritten)		

(I assume above that six CR\$ will print from top-of-label to top-of-label.) Hope it's clear. You may print entire form letters this way, complete with address and the proper "Dear John" salutation, spaced to print to top-of-form on each new copy. As an example here's the MATrix and string setup for such a form letter:

mat ddate\$

10 carriage returns to space from top-of-form to the address line, except that you overwrite ddate\$(6) to print the current date.

mat address\$

9 carriage returns, overwritten from line 1 to line 8, if needed,

with name and address pulled from your disk mail list.

salutation\$ (not a matrix)
2 lines (one blank)

mat letter\$
38 carriage returns, overwritten with a letter of not more than 38 lines.

page\$ (not a matrix)
Which is chr\$(12) and does a top-of-form to your printer, ready for the next letter.

The setup above prints 66-line form letters from my mailing list so fast that the program far out-runs my Commodore 8300 P letter-quality printer at 40 cps. Spacing of date, address, salutation

The complete print statement to my printer, on file #40, is one line.

Is it not clear that MAT statements shorten, simplify and speed up code? If you want a copy of the

form letter program, send me a self-addressed, stamped envelope. (For more information on printing APL or on SuperPET in general, write: Editor, SuperPET Gazette, P.O. Box 411, Hatteras, N.C. 27943.)

Structured Assembly Language: **Unstructured Assembly Language:**

```

loop
    jsr    kyputb_      ; get input from keyboard          AGAIN    JSR    KYPUTB_
    cmpb   #'y          ;                               CMPB   #'y
    quif   eq           ; quit this loop only when         BEQ    DONE
    cmpb   #'n          ;                               CMPB   #'n
    quif   eq           ; input is y(es) or n(o).          BEQ    DONE
endloop              ;                               BRA    AGAIN
stb    whatdo         ; store choice when made           DONE    STB    WHATDO

```

; Both programs write identical machine-language code. Which is the easier for
 ; you to write and read?

```

)WSID
DOPRINT

)FNS
GET_CHR      ΔGETSCR    CLR          ΔCURSOR     APRT         BUILD_CHARS
COMPRESS     EC        PRT_CSET   CONVFN       PAPL         DES

)VARS
X            ANS        IO         A           APLCHARS

)SI

DEAR DICK,

ON THIS DISK YOU ARE ONLY INTERESTED IN THE "DOPRINT" WORKSPACE.
I HAVE MADE A FEW CHANGES TO THE ROUTINES AND IMPROVED A FEW OF THE
CHARACTER DEFINITIONS. I HAVE ADDED "DES" FUNCTION THAT TELLS YOU HOW
TO USE THE FUNCTIONS IN THE WORKSPACE.

YOURS TRULY

Dillon

^LHRYTDLNQLGqETBQGUQLR\X+4PQQ@QZLW~A0!BI
")<=>]V^#÷,+./0123456789<[:x:\
-α|nlε_πΔλo'0|To*?ρΓ~↓Uω↑c←t→≥-
◊ABCDEFGHIJKLMNÖPQRSTUVWXYZ(-)#R_E

^LHRYTDLNQLGqETBQGUQLR\X+4PQQ@QZLW~A0!BI
")<=>]V^#÷,+./0123456789<[:x:\
-α|nlε_πΔλo'0|To*?ρΓ~↓Uω↑c←t→≥-
◊ABCDEFGHIJKLMNÖPQRSTUVWXYZ(-)#%

```

Listing 2: The APL character set, as printed on a Commodore 8023 printer from SuperPET using a technique by Delton B. Richardson. APL programs and program output may be sent to the 8023, Epson FX and MX printers.

Note: The original of the APL character set is attached at the bottom of the letter transmitting it to me. The method has been tested and works.

HesModem 1

Reviewed by Brock N. Meeks

Computer: Commodore 64 and VIC 20
Manufacturer: Human Engineered Software
150 North Hill
Brisbane, CA 94005

Telecommunications Workhorse

A team of draft horses is not likely to be confused with the HesModem 1. Yet, they have in common two distinct characteristics. One, they are slow and two, they never quit. Draft horses aside, the HesModem 1 will deliver accurate and solid performance for many years.

Every modem needs communications software. Without this software, the modem becomes just an expensive paperweight. The HesModem 1 comes complete with a terminal program. Unfortunately, it was not bred from the same stock as the modem.

The Modem

The HesModem 1 is manual dial and manual originate/answer selectable. The data transfer rate is software selectable from zero to 300 baud. It is compatible with the Bell 103 standard. You can toggle between full and half duplex manually.

To get your HesModem 1 online is painless — just plug it in. The modem plugs into the Commodore user port and requires no additional hardware to interface with the computer.

In order to actually access another computer system or computer database, the procedure is even simpler. First, you manually dial the phone number. After receiving the highpitched carrier tone, detach the cord from the handset and plug the modular jack into the modem. The HesModem 1 is equipped with a red status light which confirms access to the system dialed.

Once online, you are treated to the wonderful world of telecommunications. However, getting there, in this age of microseconds, may seem a little like sitting behind a team of horses pulling a covered wagon. The reason? The 300-baud rate of data transfer. At 300 baud, the data scrolls by at a readable speed. However, when online, it may not always be expedient to read the text as it appears on your screen. This especially applies if you are hooked into a commercial database such as Compu-

Serve or The Source. A data transfer rate of 300 baud is like using cassette storage instead of a disk drive. Well, maybe not that bad, but you get the point.

Of course you could get a 1200-baud modem. But instead of being out \$60, you would see gaping holes in your bank account of \$300 to \$500!

Once the modem is in place, the rest of the telecommunications duties fall on the terminal software.

Terminal Software

The software provided with the HesModem 1 is supplied by Midwest Micro, out of Kansas City, Missouri. The software allows you to configure the modem in numerous ways. Software selectable are: baud rate, parity, word size, stop bits, linefeed and color or black and white video signal.

The program allows for three different Commodore configurations: the unexpanded VIC 20, VIC 20 with additional memory and the C64. In the unexpanded mode, data is received in the VIC standard of 22 characters per line. However, with additional memory, the software will convert the VIC to the C64 standard of 40 characters per line.

Features

There is a receive buffer allocated in the expanded VIC and the C64. This allows the "capturing" of data for output to a printer. With an unexpanded VIC, hard copy printout is limited to a screen dump. This is a printout of exactly what is on the screen at any given moment. Not an efficient way to capture data, but better than none.

One convenient feature is called Format. Format enables you to read incoming text in an unbroken manner. This feature is useful to reformat data which was set up for terminal screens which display 80-character lines. The software processes the incoming data by stripping tabs and excess spaces from the lines so that each line begins at the left edge of the screen.

The print buffer feature is used for obtaining a hard copy record of all captured data. You can edit

the buffer only by adding to it. There is no provision for deletion. Adding to the buffer is done from the half duplex mode. The ability to add to the buffer in this way is helpful for annotating the sessions you spend online. Annotations might include information such as the date or noting from which particular database the information was retrieved.

Gripes

I have three complaints about the software—one minor, and two major. First the minor complaint. Whenever you print the buffer, the results are only in lower case. The program does not recognize upper case characters. This is only slightly disturbing, but certainly not devastating.

The first major complaint is that the program is available only on tape. Since the program is protected, the making of a backup disk is impossible. Loading the program from tape is a slow torture for anyone regularly using a disk drive.

Second, and most disturbing, is that there is no provision for downloading data to a storage device. This also means you cannot upload the buffer with previously prepared data.

Without a download/upload capability, you are not able to take advantage of the numerous public domain software programs lurking about in any number of electronic bulletin boards. And caution must be exercised after an extended online session. If you have captured a large amount of data and do not choose to print it out, that data is lost once the computer is turned off.

Documentation

The documentation package is lean. In fact, 16 pages lean. Included with the modem is a booklet that gives the absolute minimum knowledge as to the operation of the modem and software. To be fair however, there is little more that must be explained that cannot be found in the booklet. After all, one of the appealing features about the HesModem 1 is its simplicity.

Summary

The HesModem 1 is an excellent and economical vehicle for venturing into the world of telecommunications. It is easy to overlook the obvious shortcomings of the "free" software that comes with it, and certainly you are not obligated to use the included terminal program. There are other programs commercially available that will supply all the versatility you would need.

The HesModem 1 is a thoroughbred trapped in the body of a workhorse. If you find yourself wanting to travel the electronic airwaves and decide to hitch your computer to the HesModem 1, you'll find that like our team of draft horses, it may be slow but it will never quit.

Circle Reader Service No. 502 C

The Globetrotting Computer

(Continued From Page 33)

Check with proposed hotel(s) in advance, and be sure to mention your Commodore's mere 40-watt power needs. Most non-computer owners imagine computers require massive amounts of electricity.

Insurance

Some people think insuring a computer when traveling is hard. Wrote one writer, "I was forced to take \$10,000 worth of software and equipment on the airplane without any insurance." Supposedly, companies balked at foreign coverage, or in-transit coverage or coverage period. Not true.

S. Bernard Zivin, an independent agent in Chicago for 35 years, states that no informed agent should flinch at insuring a computer worldwide, even in-transit. To minimize potential problems, your computer equipment should be added to your homeowner's or renter's policy as a "personal article floater"—that is, an item specifically listed on your policy by brand name, model number and serial number. My insurance, with a \$100 deductible, costs \$22/year for \$2,210 of coverage as part of a traveler's policy.

The drawbacks of such a policy are the required deductible and lack of coverage for software. Also, since floaters cover individual items, if you frequently upgrade and alter your setup, you will have to reschedule your policy repeatedly.

If partial coverage that needs frequent adjustment bothers you, even these problems are surmountable, although you pay dearly. Such companies as Safeware of Columbus, Ohio, have appeared, catering to personal computer owners (phone: 800-848-3469). Only recently have they arranged international coverage.

For people looking for a comprehensive individual policy on computer equipment, this sort of company is the solution. It covers everything—including all software, for all kinds of loss (except resulting from owner negligence)—for full replacement value.

Their international insurance is not under their regular computer owners' program. So, instead of a \$60 premium—the domestic rate for \$2,500 in equipment, with a \$50 deductible—expect to pay \$200 for any coverage below \$5,000.

Whatever your coverage, if your computer (any property, in fact) is lost, damaged or stolen, report it and initiate the paperwork immediately to the nearest appropriate authority—citing all information (including serial numbers). That will strengthen and speed your claim. Also, in some less developed nations, if you don't report an item lost on an air-

(continued on page 121)

Database Manager

Reviewed by Ted Salamone

Computer: Commodore 64

Publisher: Mirage Concepts
2519 W. Shaw No. 106
Fresno, CA 93711

Medium: Disk

A database management program is very useful because of its ability to store, retrieve and manipulate information quickly and accurately.

As with all software, value is based on utility. This in turn depends upon factors like ease of use, flexibility and power. A program of limited capability is no bargain at any price; whereas a first class package at a realistic price is a real gem.

That brings us to Mirage Concepts' *Database Manager* for the 64. The manual, a vinyl three-ring looseleaf binder with pockets for program and data disks speaks quality.

Unlike most, this one is easy to follow, concise and incredibly error-free. The introduction has general information about database structures, program origins, specs and features, and a quick overview of the 64 itself. Care and handling of disks, how to get a backup of the program disk (mail order for a nominal fee), a word about printers and operating tips follow. Most of the manual, however, is composed of ten beginning and advanced tutorials. Written with the novice computerist in mind, it is truly a step-by-step guide. Organized and presented in an extremely logical fashion, these well illustrated lessons will have you using the manager in a few hours, even if you've never used one before.

Execution of the program is just as straightforward as the paper layout. No nasty surprises awaiting the uninitiated! *Database Manager* is menu-driven, makes good use of the function keys and allows for better readability through screen color changes. It provides a backup utility for making copies of irreplaceable data and has plenty of room for just about any size form.

Main menu commands are entered with just one numerical keystroke, while the submenus use the function keys. Field lengths are set by underlining the area(s) desired. All or selected records can be reviewed and editing is a snap. Deletion is just as easy. Searches can be conducted for exact and beginning field matches as well as wild cards using the asterisk anywhere within the first 15 characters. The latter two are helpful when the exact name of a file escapes you momentarily.

Sorting can be accomplished numerically or alphabetically using any field. Users are not limited to a unique key field with this program. Furthermore a sort index can be saved to disk and multiple sorting (by one parameter after another) is possible to the nth degree. That's real flexibility!

The print function is designed to interface with Commodore printers, though workalikes will do nicely. Output can be done as on screen (form format), as a list, a label or a report wherein subject and column titles, decimal placement, page formatting and page

numbering are all possible.

Calculated fields within a form are also an option. All the BASIC mathematical operators are available. Working from information keyed into specified fields, the program automatically performs the desired arithmetic with each update.

Another important feature is the use of conditional statements for review or selection of records. Working with alpha or numeric parameters, the process allows for screen or printer output of names or numbers above (beyond), below or between specified ranges. For example, zip codes between 45876 and 01873.

The file commands chapter provides a detailed explanation for every function on that menu, from subfile creation and field replacement to file packing (freeing the space used by now deleted data). File merge, creation of sequential files for word processor interfacing, file deletion and the directory function are also discussed.

Though this may seem like a lot (and it is), *Database Manager* is a real joy to use. It's fast, powerful and almost foolproof. The uncomplicated command structure and ability to interface with numerous word processors are a real blessing.

At just \$89.95 suggested retail, you can see why this product is worth considering for your data management needs.

Circle Reader Service No. 503 C

Tool 64

Reviewed by Elizabeth Deal

Computer: Commodore 64
 Publisher: Handic Software
 Fellowship Road
 Mt. Laurel, NJ 08054
 Medium: Cartridge



Elizabeth Deal

Tool64 is a "language enhancer" whose purpose is to fill the void of some missing BASIC commands. It contains program editing and debugging utilities, as well as a wealth of run-time commands including high-resolution graphics and a unique normal-resolution screen control and data-gathering system. The slant of the package is graphics and form designs for input and output on the screen.

Tool64 is a mixed bag of goodies. Let's look at some utilities first, as they are the most important to have and are most portable.

Utilities for Program Writing

The usual toolkit-type commands such as auto line numbering, deleting specified line ranges and renumbering program lines are included. Renumbering is limited to renumbering a whole program or a tailend section of a program (line x to the end of a program). You *cannot* renumber just a segment (at least I haven't found a way to do it).

DUMP displays the current values of all variables and strings and is useful in debugging a program that is misbehaving. But there is an ambiguity in the output from the DUMP command. It cannot tell a function definition from a variable. So, if your program contains a function named X and a variable named X, both appear as X=some value. You will have to decide which is which, not an easy task when you are chasing a bug, because that is precisely the time when you have lost control of the values and cannot tell a correct one.

The ERROR command is normally used when the BASIC interpreter reports an error. This command lists the bad line and shows the spot at which the program stopped in reverse characters. Handy.

The FIND command is meant to find things in a program. Line range is supported. It can be used in a running program, though I can't get that feature to

work. But that's no problem because there is little reason to FIND anything in a running program. But I have to admit that I am completely baffled how to use the FIND instruction in the *Tool64* environment. Some words come out. Some words come out only once, even though they appear more than once in a program. Some do not come out at all. Some come out if they are written in a certain way. For instance, "test" in PRINT "test" shows up, but in PRINT "this is a test" does not. I see no wild card searches and am unable to get this to work reliably. To add insult to injury, one recommended syntax is "ampersand-string to find-ampersand". Mind boggling, since that invokes the DOS-wedge. I suspect the documentation is bad and the command works somehow. Check with your dealer.

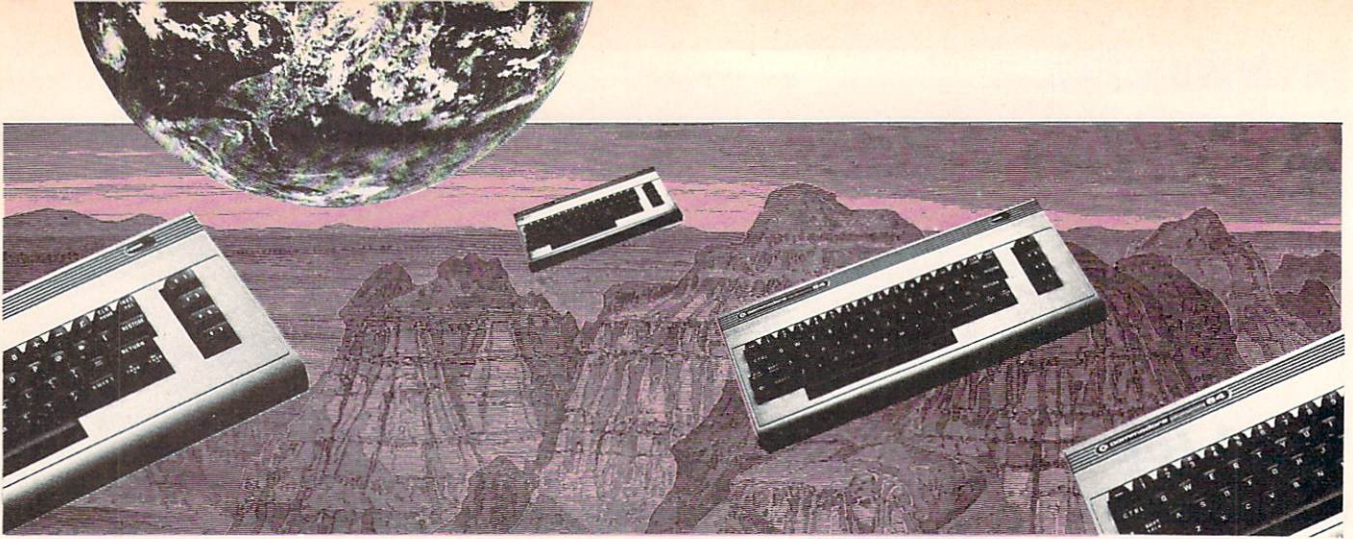
TRACE can be invoked during a program run. When it is called, an entire line of BASIC shows up on top of the screen so you can watch a program executing in slow motion. The SHIFT key resumes execution. This is a good command, but slightly inconvenient to use, as you cannot control the speed of TRACE. It's either single step or nothing. Nevertheless it is valuable. OFF turns off the TRACE.

DOS Wedge/Disk Utilities

Tool64 contains the vital DOS wedge commands. They omitted some unnecessary (in my opinion) commands, such as LOAD and RUN. That's not a loss. The key ones — reading the error channel, sending commands to disk and getting the directory — still with us.

However, the directory display is a seriously stripped down version. You cannot use pattern matching — you must see the entire directory even if you just want to check on one sequential file. I can't explain why this is so, since the disk understands the full syntax of that command. An additional small and undocumented nuisance is that only the space bar functions as a pause key.

Curiously, there is no way to reassign the disk-talk to a device other than eight. I changed one disk unit to nine and never found a way to tell the wedge to talk to that device. One careless wedge instruction



on my part crashed the computer and that was that.

Tool64 powers up in black. What a relief from the blinding blue! It also comes up with all keys repeating, so if you don't want that feature (I normally don't), POKE 650,0 to kill it and just have the normal cursor repeat.

I haven't found a command to disconnect the package. (Frankly, I do not even know if a cartridge program can ever be disconnected.) Sometimes you may not want to have a utility active. But turning off the computer and removing the cartridge seems to be the only way to disconnect. It is an inconvenience, considering that it is no easy task to remove it from a computer. Filing down the edges of the cartridge board helps a bit, but it is still a great struggle.

Debugging and utility commands, by definition, must coexist with as many programs in memory as possible. *Tool64* does this job rather well with some of my programs, including *Supermon*. Unfortunately the book is totally silent on the issue. A major fault in an otherwise excellent documentation.

Overall, as debugging packages go, this one is certainly useful, but not as powerful or bug-free as others I have seen. It seems that the utilities package is rather small considering the possibilities. But the tradeoff for smallness is a bunch of fabulous screen manipulation commands for both graphic displays and user inputs.

Screen and Data Commands

This section includes all other *Tool64* commands. The commands can be used in both direct and program mode. Their syntax is meticulously described in the book. Many commands require many parameters, mostly of the type: starting line, starting column, data description, what to do and where. The order of parameters is fixed. Apart from having some trouble in distinguishing the letter "l" from a number one, I had no problem putting the commands to work. It was lots of fun reviewing this section of the cartridge.

Normally when extra commands are added to the interpreter, all BASIC processing is slowed down. *Tool64*, in my opinion, is very fast. I noticed,

perhaps, a six percent time penalty. That is unnoticeable except in some strictly timed situations.

In high-resolution mode the following are supported: GRAPHIC mode flips on the high-resolution screen. You can MOVE a (invisible) cursor, PLOT and erase points, check if a point is on, DRAW and erase lines, print (DISPLAY) normal text at any location that is a multiple of eight and set plotting and text colors (both the same). These commands alone are worth their weight in gold. The syntax is simple; for example, to plot a point at x,y you code PLOT x,y,1. To erase a point you use the same command with a zero at the end. Nicely done.

Bit-mapped screen images can be saved on disk. They can be loaded back. They load into the high-resolution area of memory correctly whether you are in the bit-mapped mode or not.

Color settings are supported for both the high-resolution and normal modes. There seem to be no commands for multicolor bit-mapped display. There is only so much room on a cartridge.

TEXT mode is the normal screen setting. Here you can frame any area, reverse it, scroll it in any of four directions, clear it and save it. This is invaluable in designing a screen to look good, be it part of a game or some serious application. You can scroll information within a window, have several windows on the screen at one time... imagination is the limit. PET users are familiar with this sort of routine from *Supergraphics*. Valuable routines.

There is more. You can define certain areas of the screen as input zones. You can describe what sort of data can be placed in an area (alphabetic, numeric, what sort of numeric, how many digits, etc.). Subsequent use of what the book calls "data acquisition commands" permits instant data verification. This is a whole new language and while the book is very precise, there aren't too many examples, so you have to approach it as a new thing to be learned. It isn't hard, it's just new. It's very useful stuff.

Strangely enough, screen output also falls under "data acquisition." No matter, this is where strings and variables can be printed, all nicely formatted as in PRINT USING.

You can save screens normally; the definitions can be saved with the screen file. You can easily swap a screen with a disk-screen file (as you might wish to do with a HELP screen).

The screen SAVE and LOAD commands are fast and most useful. One slight problem: the system does not remember what colors it saved — the border, background and character settings — hence you have to provide your own means to do that. That's not a problem. There is one slight problem when the LOAD or SAVE is finished. The computer says READY right on your screen image. It would be nice if "READY" were suppressed in direct mode. However, the cursor stays in place and that is a very good thing.

Whenever you ask for GRAPHIC mode (i.e., high-resolution) *Tool64* flips the current normal mode screen out. I don't know if they switch it or store it in a temporary area; the book doesn't say. It is an important omission — we have to know what area of memory (under BASIC?) is being used — if any. I think color memory image must be stored someplace, but I couldn't switch that area to be RAM with the cartridge in place. Once again, perhaps it's me. I do not understand anything about the magic of cartridges.

That's about it. There are several other small commands that are useful, but none as important as the ones listed in this section.

While the screen managing commands are fascinating and useful, bear in mind that if you code them into your own programs, they will not run on another Commodore 64. To RUN properly, the other 64 must have *Tool64*. This is not a problem for many users. Many of us have our own, private applications where commands such as the ones described in this section can be used for splendid data control. But don't forget, such problems must never travel to users who do not have *Tool64*. This is not the case with the debugging and utility commands — programs written using RENUMBER or the DOS wedge can, of course, run on any computer.

Final note: there is something strange when the whole system initializes. As everybody knows, a cartridge must be plugged in with a computer turned off. A disk drive must be turned on before the computer (my recent 64 will not show bytes free unless a connected drive is turned on). So we plug in the cartridge, turn the computer on and for some reason it wants to talk to the disk. There being no floppy in the drive, the light begins to flash — you must use the wedge error reading command to settle the light down. I do not understand why all this is happening; other cartridges do not behave this way at all. It is not a major problem, of course, but is a nuisance. **Circle Reader Service No. 504 C**

The Globetrotting Computer (Continued From Page 117)

line to authorities at the airport where loss or damage is first discovered *when* first discovered, they won't accept any claims against them. This happened to me in Nepal.

Support Abroad

Commodores are sold in at least 40 countries. The 64's are the top selling personal computer in Europe. Commodore dealers abroad also handle supplies and maintenance support. For specific addresses of dealers and other information, contact the International Sales staff in the Bahamas, as mentioned previously.

Additional support can come from foreign user groups. This magazine lists 24 Canadian groups, as well as 19 more in 13 other foreign countries.

Technical support and maintenance for those in out-of-the-way restricted nations will be minimal or nonexistent. Behind the Iron Curtain, for instance, no Commodore offices exist. Paul Schlichter, a European representative of another company, Kaypro, paints an unsettling picture for such travelers: "Users in those countries contact me by phone and try to solve their problem themselves. For U.S. users traveling to these countries, I suggest they buy the technical manual."

The software packages available overseas are not necessarily what Americans get and they may not be in English. Therefore, know your software thoroughly before traveling; don't delay learning or expanding your library until abroad.

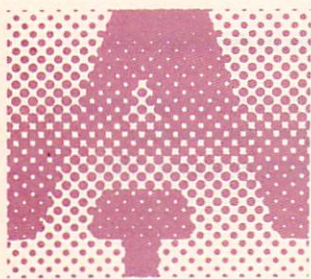
Last Thoughts

Important questions remain that only you can ask and answer. How important is your computer in your travels — enough to justify the expense, hassles, extra weight, bureaucracy and potential sense of insecurity in bringing a valuable item abroad? Are you traveling so much that your computer will weigh you down like an anchor? And is your Commodore appropriate where you are going? For instance, a friend who is considering taking a computer to New Delhi knows its potential value to his academic work in India... and how quickly word of his computer will spread. The probability of theft worries him greatly.

But if you feel your Commodore is appropriate for your travel, this article can start you on your way. In the words of a popular TV chef, after creating an intricate nine-course meal in three minutes, "Very simple, very easy."

Bon voyage.

C



Write Now! (Or go to Your Room)

Reviewed by Kelley M. Essoe

Computer: Commodore 64
Publisher: Cardco, Inc.
313 Matheson
Wichita, KS 67214
Medium: Cartridge

Write Now! for the Commodore 64 from Cardco is to word processing what cartoons are to television: easy to turn on, moderately amusing, ludicrously intriguing, subtly powerful, surprisingly charismatic and somewhat undignified.

Yet behind a cacophony of "reassuring ticks," constrained and regulated input parameters, spasmodic scrolling and the generally un-serious look of this word processor, (all of which I'll explain later) there lies some very powerful capabilities that cannot be found on word processors for twice the price. And the people at Cardco have tried very hard to make them easy and accessible.

Included in the *Write Now!* package are two paper overlays for you to cut out and place over the keyboard. One fits over the function keys, the other goes above the main keyboard and fits... somehow. This particular one has a "fold along dotted line" instruction and maybe I'm daft, but I wasn't quite sure what I was supposed to do with the folded part. Reason, in the form of my eight year-old expert at sticking things into small places, suggested that I snug the fold into the gap between the top row of keys and the casing. Simple, right? My only defense is that at times of frustrations, simplicity is the last frontier to be investigated.

The overlays mark what functions the corresponding keys perform. The function keys are used both shifted and unshifted, and the top left eleven keys on the keyboard are used with either the CONTROL or the Commodore logo keys. Altogether, *Write Now!* gives you a total of 30 "labeled" command keys.

The myriad of commands offered by *Write Now!* are unquestionably notable. Just about all of the standard, even some not so standard, editing functions are here.

The dedicated command keys give you access to a terrific assortment of functions such as block controls, search and search and replace, insert mode, place markers, deletions, tabs and various printer and disk drive commands. There are also specific keys for text buffer dumps and clears, quick scrolling by screen page, cursor placement to top or bottom of text, and CRT color selection.

Text formatting, a shorthand term for defining the finished "look" of your document, such as margins, line spacing, justification and such, is accomplished primarily through the use of "dot" commands. A dot command consists of a specific code sequence that is preceded by a dot (or a period, if you will) and followed by hitting the RETURN key. These commands must appear in the leftmost column of a screen line, but can be placed at any point within the body of your text. This means that

you can, for example, define a particular set of margins for one paragraph, use a different set for others, left-justify these, center those, and triple space another down there.

I counted a total of 24 different dot commands supported by *Write Now!*, 15 of which run the gamut of the basic formatting standards from setting margins, page length and line spacing to fixing headers, justifications and automatic page numbering.

So what about the other nine? Aha! Tune in on these and *Write Now!* changes channels and takes you from Casper the Friendly Ghost to He-man and the Masters of the Universe, with commands that you don't often find in word processors.

For instance, it can be a frustrating moment when you discover that although your expensive dot matrix printer can offer you a vast world of impressive print style combinations, like double-strike-emphasized-elongated-pica-italics, alas, your word processor cannot. *Write Now!* is the only word processor for the 64 that I know of which has extended capabilities to send "escape sequences" down to your printer.

With *Write Now!*'s marvelous "E" command, you can take full advantage of all of your printer's type styles, modes and special characters... not just the depressingly few choices that most other word processing authors thought to make provisions for.

Other remarkable and thought-

ful functions that *Write Now!* offers include the versatile "K" and "V" commands.

When the "K" command is encountered during hard-copy output, the printer will pause and the word processor will prompt you for keyboard input of up to 36 characters. This can be very handy for personalizing form letters while the copies are being printed out. The "V" command places a particular field of data into text at the point where the "V" variable is found. In other words, "Va" could represent "name," "Vb" the field "address," and so on. This command gives you mini mail-merge abilities from within *Write Now!*, although Cardco's compatible *Mail Now!* program would be an easier way to tackle the larger mailings.

This program also supports multiple line headers and footers, automatic page numbering in either Arabic or Roman numerals, and an optional joystick control command for scrolling.

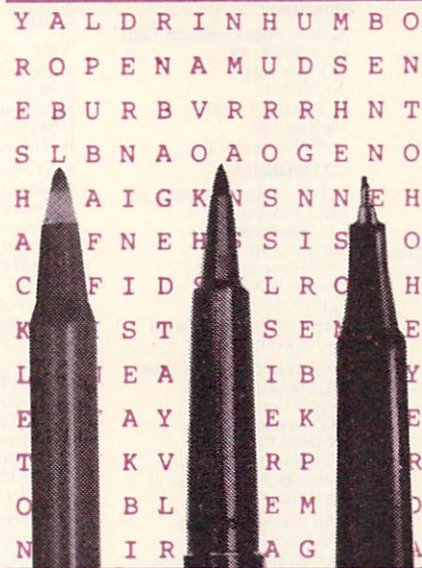
Write Now! does offer an 80-column video display, but the clarity leaves a lot to be desired so don't count on this for anything more than checking the overall appearance of your document.

Other options such as setting device numbers, secondary addressing and other printer and disk drive commands are selected through the options, printer and disk menus. Also, four help screens can be called up at any time to remind you of the various functions and formatting commands.

Still, in spite of the program's power, my initial reaction was that it was not created with a grownup in mind. As a matter of fact, my eight year-old loves it. First of all, it has sound effects reminiscent of a video game. Kids like noise. They like to make noise and have noise made at them. *Write Now!* certainly fits that bill.

Pop! Pop! Pop! That's the first

thing I noticed when I sat down to the business of *WRITEing NOW!* When you type, the machine responds with a sound not unlike a bunch of bubbles bursting. And moving the cursor elicits something like a machine gun firing blank rounds. The manual describes these sound effects as "reassuring ticks." Personally I don't find ticks at all reassuring. My college psychology teacher had one... it tended to make his sanity appear questionable. Moving the cursor to top of screen or below text is not recommended. The machine startles you with a rather loud no-no. Bong! Bong! it says, slapping your senses silly. Any naughty act on your part will elicit this same reprimand. Even the manual describes this re-sounding emission as "nasty." Sometimes the word processor will flash you an exclamation message at the same time. **ALREADY MARKED! NOT MARKED! BLOCK SET INCORRECTLY!** You half expect it to rap you across the knuckles with a ruler.



Another immediately noticeable eccentricity is the fact that there is only one input line. Welcome to the cursor line. For the duration of your writing experience this will be your home base. Instead of

being able to move the cursor around the screen to text, text scrolls up or down to the cursor line. In other words, if I spot an error above where I am currently writing and I move the cursor up to go and fix it, the cursor and I actually stay right where I am. The text obligingly comes to us. I know there is really nothing inherently wrong with this. After all, the means do accomplish the ends, and I did fix the typo in line three. I suppose it's just a matter of personality. I got the feeling that I wasn't getting anywhere, and worse, I was being clearly informed that I couldn't go anywhere... kind of like being grounded.

True, these particular idiosyncrasies are not overwhelming and can be adjusted to. I can always turn off the sound on my monitor. Then at least I don't have to listen to the ceaseless pops, thuds, beeps, honks and rat-a-tat-tats. And I suppose I could eventually resign myself to being tethered within the confines of a single cursor line. So much for adventure.

A not so easily dealt with, and somewhat distressing feature is the quality of scrolling. This is definitely *not* a smooth scroll... the text sort of jumps and jerks its way across the cursor line. And it's near impossible to keep your eye on a specific area of text while it's hippity-hopping about like a frightened bunny.

Nevertheless, all in all, I must say that *Write Now!* is not at all lacking in versatility nor in power. Still, this is not really a professional writer's tool.

But if you just want to write a few letters, jot down a diary, create a term paper or give your kids their own word processor, and your main requirements include low-cost, clear cut instructions, and ease of use, then by all means, turn down the sound on your monitor and... *Write Now!* C

Circle Reader Service No. 507

Because our user group listing has become excessively long, we are now publishing only a partial list in each issue. This time we've included all our user groups in states beginning with letters A through M. Next issue we'll publish all the groups in states beginning with letters N through W and all foreign groups. Then the following issue, it's back to A through M, and so on, until we get so many that we have to publish it in three—or four—or more—parts.

User Group Listing

ALABAMA

Huntsville PET Users Club
9002 Berclair Road
Huntsville, AL 35802
Contact: Hal Carey
Meetings: every 2nd
Thursday
Riverchase Commodore
Users Group
617 Grove St.
Birmingham, AL 35209
(205) 988-1078
Ken Browning
Wiregrass Micro-Computer
Society
Commodore SIG
109 Key Bend Rd.
Enterprise, AL 36330
(205) 347-7564
Bill Brown
Tiger Byte: E. Alabama
CBM 64
Users Group
c/o The Computer Store, Inc.
Midway Plaza
Opelika, AL 36801
Jack Parsons
1st & 3rd Wed. of Month
The Birmingham Commodore
Computer Club
Birmingham, AL
(205) 923-9260
Harry Jones
Commodore Club of Mobile
3868-H Rue Maison
Mobile, AL 36608
(205) 343-1178
Tom Wyatt
3rd Thurs. of month
Shoals Commodore Users
Group (SCUG)
209 Lakeshore Dr.
Muscle Shoals, AL 35661
Geo. Taylor
2nd & 4th Tues. of month
1920-A Avenue C
Brookly
Mobile, AL 36615
(205) 661-1973
Howard Crider
CC & Me
P.O. Box 324
Pinson, AL 35126
(205) 854-0650
Bill Freeman
1734 S. Atmore Ave.
Whistler, AL 36612
(205) 452-9740
William Autry
ALASKA
COMPOOH-T
c/o Box 118
Old Harbor, AK 99643
(907) 286-2213

Alaska 84 Computer Club
c/o Line 49 Management
P.O. Box 6043
Anchorage, AK 99502
First City Users Group
P.O. Box 6692
Ketchikan, AK 99901
(907) 225-5695
James Llanos
ARIZONA
VIC Users Group
2612 E. Covina
Mesa, AZ 85203
Contact: Paul Muffuletto
Catalina Commodore
Computer Club
2012 Avenida Guillermo
Tucson, AZ 85710
(602) 296-6766
George Pope
1st Tues. 7:30 p.m.
Central Arizona PET People
842 W. Calle del Norte
Chandler, AZ 85224
(602) 899-3622
Roy Schahrer
ACUG
c/o Home Computer Service
2028 W. Camelback Rd.
Phoenix, AZ 85015
(602) 249-1186
Dan Deacon
First Wed. of month
West Mesa VIC
2351 S. Standage
Mesa, AZ 85202
Kenneth S. Epstein
Arizona VIC 20-64 Users Club
232 W. 9th Place North
Mesa, AZ 85201
Donald Kipp
Arizona VIC & 64 Users
904 W. Marlboro Circle
Chandler, AZ 85224
(602) 963-6149
Tom Monson
Canyon De Chelly—Four
Corners Users Group
c/o Calumet Consulting
Box 1945
Chinle, AZ 86503
(602) 674-3421
Larry DiLucchio
they meet bi-monthly
ARKANSAS
Commodore/PET Users Club
Conway Middle School
Davis Street
Conway, AR 72032
Contact: Geneva Bowlin
Booneville 64 Club
c/o A. R. Hederich
Elementary School
401 W. 5th St.

Booneville, AR 72927
Mary Taff
The Siloam Commodore
Computer Club
P.O. Box 88
Siloam Springs, AR 72761
(501) 524-5624
Ken Emanuelson
Russellville Commodore
User Group
401 S. Arlington Dr.
Russellville, AR 72801
(501) 967-1868
Bob Brazeal
Arkansas River Valley
Commodore Users
401 S. Arlington Dr.
Russellville, AR 72801
(501) 967-1868
Bob Brazeal
P.I.C. Club
c/o Hatfield Public Schools
Box 130
Hatfield, AR 71945
(501) 389-6164
Bob Reed
Commodore Computer Club
of Ft. Smith, AR
P.O. Box 6000
So. Station
Ft. Smith, AR 72906
Joe Ragsdale
2nd Tues. of month
CALIFORNIA
SCPUG Southern California
PET Users Group
c/o Data Equipment
Supply Corp.
8315 Firestone Blvd.
Downey, CA 90241
(213) 923-9361
Meetings: First Tuesday of
each month
California VIC Users Group
c/o Data Equipment
Supply Corp.
8315 Firestone Blvd.
Downey, CA 90241
(213) 923-9361
Meetings: Second Tues. of
each month
Valley Computer Club
P.O. Box 310
Denair, CA 95316
PUG of Silicon Valley
22355 Rancho Ventura Road
Cupertino, CA 95014
Lincoln Computer Club
750 E. Yosemite
Manteca, CA 95336
John Fung, Advisor
PET on the Air
525 Crestlake Drive
San Francisco, CA 94132
Max J. Babin, Secretary

PALS (Pets Around)
Livermore Society
886 South K
Livermore, CA 94550
(415) 449-1084
Every third Wednesday
7:30 p.m.
Contact: J. Johnson
SPHINX
267 Arlington Ave.
Kensington, CA 94707
(415) 527-9286
Bill MacCracken
San Diego PUG
Box 86531
San Diego, CA 92138
(619) 277-7214
Jane Campbell
3rd Thurs. 7-10 p.m.
Walnut Creek PET
Users Club
1815 Ygnacio Valley Road
Walnut Creek, CA 94596
Jurupa Wizards
8700 Galena St.
Riverside, CA 92509
781-1731
Walter J. Scott
The Commodore Connection
2301 Mission St.
Santa Cruz, CA 95060
(408) 425-8054
Bud Massey
San Fernando Valley
Commodore Users Group
21208 Nashville
Chatsworth, CA 91311
(213) 709-4736
Tom Lynch
2nd Wed. 7:30
South Bay Commodore
Users Group
1402 W. 218th St.
Torrance, CA 90501
Contact: Earl Evans
The Diamond Bar R.O.P.
Users Club
2644 Amelgado
Hacienda Hgts., CA 91745
(213) 333-2645
Don McIntosh
Commodore Interest
Association
c/o Computer Data
14660 La Paz Dr.
Victorville, CA 92392
Mark Finley
Computer Barn
Computer Club
319 Main St.
Suite #2
Salinas, CA 93901
757-0788
S. Mark Vanderbilt

Humboldt Commodore
Group
P.O. Box 570
Arcata, CA 95521
R. Turner
Napa Valley Commodore
Computer Club
c/o Liberty Computerware
2680 Jefferson St.
Napa, CA 94558
(707) 252-6281
Mick Winter
1st & 3rd Mon. of month
S.D. East County C-64
User Group
6353 Lake Apopka Place
San Diego, CA 92119
(619) 698-7814
Linda Schwartz
Commodore Users Group
4237 Pulmeria Ct.
Santa Maria, CA 93455
(805) 937-4174
Gilbert Vela
Bay Area Home
Computer Asso.
1332 Pine St.
Walnut Creek, CA 94598
(415) 932-5447
Cliff Downing
Amateurs and Artesians
Computing
P.O. Box 682
Cobb, CA 95426
Manteca VIC 20 Users
Organization
429 N. Main St.
Manteca, CA 95336
Gene Rong
Pomona Valley Commodore
Users Group
1401 W. 9th, #77
Pomona, CA 91766
(714) 932-8889
Mark Joerger
1st & 3rd Wed.
of month 7 p.m.
VIC TORIL-The VIC 20
Users Group
PSC #1, Box 23467
APO San Francisco, CA 96230
Wesley Clark
The Valley Computer Club
2006 Magnolia Blvd.
Burbank, CA 91506
1st Wed. 7 p.m.
The Commodore Tech. Users
P.O. Box 1497
Costa Mesa, CA 92626
VIC 20 Software
Exchange Club
10530 Sky Circle
Grass Valley, CA 95945
Daniel Upton

- C-64 West Orange County Users Group
P.O. Box 1457
Huntington Beach, CA 92647
(714) 842-4484
Philip Putman
2nd & 4th Tues. of month
- Antelope Valley Commodore Users Group
POB 4436
Lancaster, CA 93539
(805) 942-2626
James Haner
1st Saturday
- Diablo Valley Commodore Users Group
P.O. Box 27155
Concord, CA 94520
(415) 838-2838
- CA. Area Commodore Terminal Users Society
C.A.C.T.U.S.
P.O. Box 1277
Alta Loma, CA 91701
Darrell Hall
20/64
P.O. Box 18473
San Jose, CA 95158
(408) 978-0546
1st Sun. of month (6-9 p.m.)
- Software 64
353 California Dr.
Burlingame, CA 94010
(415) 340-7115
Mario Abad
Sacramento Commodore Users Group
8120 Sundance Dr.
Orangevale, CA 95662
(916) 969-2028
Robyn Graves
Peninsula Commodore Users Group
549 Old County Rd.
San Carlos, CA 94070
(415) 593-7697
Timothy Very
2nd Thurs. of Month
- San Francisco Commodore Users Group
278-27th Ave. #103
San Francisco, CA 94121
(415) 387-0225
Roger Tierce
- Commodore 64 West Computer Club
2917 Colorado Ave.
Santa Monica, CA 90404
(213) 828-9308
Don Campbell
Sixty Fourum
P.O. Box 16098
Fresno, CA 93755
John Damiano
- C-64/VIC 20 Users Group
Pasadena City College
Cicadian Room
Pasadena, CA
(714) 593-4880
Chuck Cypher
7 p.m. 1st & 3rd Thursdays
- Marin Commodore Computer Club
620 Del Ganado Rd.
San Rafael, CA
(415) 479-0426
2nd Wed. of month 7:30 p.m.
- Santa Rosa Commodore 64 Users Group
333 East Robles Ave.
Santa Rosa, CA 95407
(707) 544-7009
Garry Palmer
meets once a month
- The Exchange
P.O. Box 9189
Long Beach, CA 90810
(213) 595-1771
Michael C. Joseph, MD
- Southern California Edison Commodore Club
P.O. Box 800
Rosemead, CA 91770
Jerry Van Norton
LOGIKS Commodore Computer Club
c/o Christ Presbyterian Church
620 Del Ganado Rd.
San Rafael, CA 94903
(415) 479-0426
Elmer Johnson
2nd Wed. of month 7:30 pm
- Commodore 64 West
P.O. Box 346
Culver City, CA 90232
(213) 398-0913
Charles P. Santos
- Commodore Users Group of Riverside (CUGR)
P.O. Box 8748
Riverside, CA 92515
(714) 689-1452
Ken Brown
2nd & 4th Thurs. night
- VIC-Club: San Francisco (VCSF)
1503A Dolores
San Francisco, CA 94110
Colin Johnston
ages 10 to 16 preferred.
- SIG (Special Interest Group)
1135 Coronet Ave.
Pasadena, CA 91107
Brian R. Klotz
- VIC 20 Software Exchange
7660 Western Ave.
Buena Park, CA 90620
Vincent Beltz
- San Luis Obispo Commodore Computer Club
1766 9th St.
Los Osos, CA 93402
(805) 528-3371
Joan Rinehart
BBS (804) 528-7475
- NVCLUG
P.O. Box 1925
Chico, CA 94927
(916) 343-4611
Jim Banks, Jr.
Suisun/FF/Vacaville Commodore Users Group
1410 Pelican Way
Suisun City, CA 95485
(707) 426-2077
Charles D. Akula
- South Bay Commodore Users Group
401-9th St.
Manhattan Beach, CA 90266
(213) 374-1247
Lloyd Lehrer
- COLORADO**
VICKIMPET Users Group
4 Waring Lane,
Greenwood Village
Littleton, CO 80121
Contact: Louis Roehrs
- Colorado Commodore Computer Club
2187 S. Golden Ct.
Denver, CO 80227
986-0577
Jack Moss
Meet: 2nd Wed.
- Commodore Users Group
Box 377
Aspen, CO 81612
(303) 925-5604
Ray Brooks
1st Monday in the evenings
- Vicore Users Group
326 Emery Dr.
Longmont, CO 80501
(303) 772-2821
Wayne Sundstrom
- Aurora Market Users Group
c/o Computer Market Place
15200 E. 6th Ave.
Aurora, CO 80012
(303) 367-0901
Roger Oberdier
- CONNECTICUT**
John F. Garbarino
Skiff Lane Masons Island
Mystic, CT 06355
(203) 536-9789
- Commodore User Club
Wethersfield High School
411 Wolcott Hill Road
Wethersfield, CT 06109
Contact: Daniel G. Spaneas
- VIC Users Club
c/o Edward Barszczewski
22 Tuxis Road
West Hartford, CT 06107
- New London County Commodore Club
Doolittle Road
Preston, CT 06360
Contact: Dr. Walter Doolittle
- The Commodore East Users Group
165 B. S. Bigelow Rd.
Hampton, CT 06247
(203) 455-0108
- Commodore Users Group of Stratford
P.O. Box 1213
Stratford, CT 06497
(203) 377-8373
Dan Kern-Ekins
- Capitol Region Commodore Computer Club
57 Carter Dr.
Tolland, CT 06084
Prudence Schifley
2nd Mon. of month 7 p.m.
- CT Computer Society
180 Bloomfield Ave.
Hartford, CT 06105
(203) 233-3373
Harry Hill
last Sat. of month
- Fairfield County Commodore Users Group
P.O. Box 212
Danbury, CT 06810
Linda Retter
- DELAWARE**
The Diamond State Users Group
Box 892, RD 2
Felton, DE 19943
(302) 284-4495
Michael Butler
- Newark Commodore Users Group (NCUG)
210 Durso Dr.
Newark, DE 19711
(302) 737-4686
Bob Black
once a month Newark H.S.
- Brandywine Users Group
P.O. Box 10943
Wilmington, DE 19850
(302) 362-6162
Rick Jeandell
- DISTRICT OF COLUMBIA**
USO Computer Club
USO Outreach Center
207 Beyer Rd., SW
Washington, DC 20332
Steven Guenther
- FLORIDA**
Jacksonville Area PET Society
401 Monument Road, #177
Jacksonville, FL 32211
- Richard Prestien
6278 SW 14th Street
Miami, FL 33144
- South Florida PET Users Group
- Dave Young
7170 S.W. 11th
West Hollywood, FL 33023
(305) 987-6982
- PETs and Friends
129 NE 44 St.
Miami, FL 33137
Richard Plumer
- Sun Coast VICs
P.O. Box 1042
Indian Rocks Beach, FL 33535
Mark Weddell
- Bay Commodore Users Group
c/o Gulf Coast Computer Exchange
241 N. Tyndall Pkwy.
P.O. Box 6215
Panama City, FL 32401
(904) 785-6441
Richard Scofield
- Gainesville Commodore Users Club
3604-20A SW 31st Dr.
Gainesville, FL 32608
Louis Wallace
- Brandon Users Group
108 Anglewood Dr.
Brandon, FL 33511
(813) 685-5138
Paul Daugherty
- Brandon Commodore Users Group
414 E. Lumsden Rd.
Brandon, FL 33511
- Gainesville Commodore Users Group
Santa Fe Community College
Gainesville, FL 32602
James E. Birdsell
- Commodore Computer Club
P.O. Box 21138
St. Petersburg, FL 33742
(813) 522-2547
Chuck Fechko
- Commodore Users Group
545 E. Park Ave.
Apt. #2
Tallahassee, FL 32301
(904) 224-6286
Jim Neill
- The Commodore Connection
P.O. Box 6684
West Palm Beach, FL 33405
- El Shift OH
P.O. Box 548
Cocoa, FL 32922
Mike Schnoke
Sat. mornings/every 4 to 6 weeks
- Miami 20/64
12911 S.W. 49th St.
Miami, FL 33175
(305) 226-1185
- Tampa Bay Commodore Computer Club
10208 N. 30th St.
Tampa, FL 33612
(813) 977-0877
- Commodore Computer Club
P.O. Box 9726
Jacksonville, FL 32208
(904) 764-5457
David Phillips
2nd & 4th Tues. of Month
- VIC/64 Heartland Users Group
1220 Bartow Rd. #23
Lakeland, FL 33801
(813) 666-2132
Tom Keough
4th Wed. of Month at PRC
- 64 Educators Users Group South
FDLRS-South
9220 S.W. 52nd Terrace
Miami, FL 33165
(305) 274-3501
Dr. Eydie Sloane
- 64 Educators Users Group North
16330 N.E. 2nd Ave.
North Miami Beach, FL 33162
(305) 944-5548
Robert Figueroa
- Suncoast 64S
c/o Little Professor Book Center
2395 U.S. 19 North
Palm Harbor, FL 33563
(813) 785-1036
Curtis Miller
- Lakeland VIC 20 Users Group
2450 Shady Acres Dr.
Mulberry, FL 33860
- Broward Commodore Users Group
13 Spinning Wheel Lane
Tamarac, FL 33319
(305) 726-4390
Lewis Horn
- Volusia Ct. Commodore Program Exchange
1612 Reynolds Rd.
DeLeon Springs, FL 32028
Rick Stidham
- The Ultimate 64 Experience
5740 S.W. 56th Terrace
Miami, FL 33143
Sandy Cueto
- Clearwater Commodore Club
1532 Lemon St.
Clearwater, FL 33516
(813) 442-0770
Gary Gould
- The Commodore Advantage
P.O. Box 18490
Pensacola, FL 32523
(904) 456-6554
Deanna Owens
2nd Friday of month
- South Tampa Commodore 64 Users Group
736 F Second Dr.
Macdill AFB, FL 33621
Ronald S. Clement
- Ram Rom 84
1620 Morning Dove Lane
Englewood, FL 33533
(813) 474-9450
Nancy Kenneally
- Sanibel Commodore Users Group (SCUG)
1119 Periwinkle Box 73
Sanibel, FL 33957
(813) 472-3471
Phil Belanger
- Charlotte County Commodore Club (CCCC)
567 N. Ellicott Circle
Port Charlotte, FL 33952
(813) 625-1277
Lee Truax
- Tampa Commodore Users Group
P.O. Box 8713
Tampa, FL 33674
(813) 237-2100
- The Class of 64
c/o The Computer Corner
5208 66th St., North
St. Petersburg, FL 33709
(813) 541-1185
Joe Statafora
- GEORGIA**
VIC Educators Users Group
Cherokee County Schools
110 Academy St.
Canton, GA 30114
Dr. Al Evans
Bldg. 68, FLETC
Glynco, GA 31524
Richard L. Young
- VIC-tims
P.O. Box 467052
Atlanta, GA 30346
(404) 922-7088
Eric Ellison

Golden Isles Commodore Users Club
Bldg. 68, FLETC
Glynco, GA 31524
Richard L. Young

Commodore Club of Augusta
1011 River Ridge Rd.
Apt. #14-A
Augusta, GA 30909
David Dumas

Atlanta Commodore 64 Users Group
1767 Big Valley Lane
Stone Mountain, GA 30083
(404) 981-4253
Ron Lisoski

Atlanta 64 Users Group
P.O. Box 5322
Atlanta, GA 30307
Phil J. Autrey

Albany Commodore Amateur Computerist
P.O. Box 5461
Albany, GA 31706
David Via

HAWAII

Commodore Users Group of Honolulu
c/o PSH
824 Bannister St.
Honolulu, HI
(808) 848-2088
3rd Fri. every month
20/64 Hawaii
P.O. Box 966
Kailua, HI 96734
Wes Goodpaster

Commodore Users Group of Honolulu
1626 Wilder #701
Honolulu, HI 96822
(808) 848-2088
Jay Calvin (808) 944-9380

IDAHO

GHS Computer Club
c/o Grangeville High School
910 S. D St.
Grangeville, ID 83530
Don Kissinger

S.R.H.S. Computer Club
c/o Salmon River H.S.
Riggins, ID 83549
Barney Foster

Eagle Rock Commodore Users Group
900 S. Emerson
Idaho Falls, ID 83401
Nancy J. Picker

64 Bug (Boise Users Group)
P.O. Box 276
Boise, ID 83701
(208) 344-6302
John Rosecrans

U.G.L.I.—User Groups of Lower Idaho
Rt. 4
Rupert, ID 83350
Sean Brixey, President

Commodore Users Group
310 Emerald Dr.
Kellogg, ID 83837
(208) 784-8751
Grant Bewick

64-B.U.G. (Boise Users Group)
403 Thatcher St.
Boise, ID 83702
(208) 384-1423
Rick Ohnsman

Pocatello Commodore Users Group
1250 E. Benton
Pocatello, ID 83201
(208) 232-1607
Richard Harker

ILLINOIS

Shelly Wernikoff
2731 N. Milwaukee
Peru, IL 61354

Avenue
Chicago, IL 60647
VIC 20/64 Users Support Group
c/o David R. Tarvin
114 S. Clark Street
Pana, IL 62557
(217) 562-4568

Central Illinois PET User Group
635 Maple
Mt. Zion, IL 62549
(217) 864-5320
Contact: Jim Oldfield

ASM/TED User Group
200 S. Century
Rantoul, IL 61866
(217) 893-4577
Contact: Brant Anderson

PET VIC Club (PVC)
40 S. Lincoln
Mundelein, IL 60060
Contact: Paul Schmidt, President

Rockford Area PET Users Group
1608 Benton Street
Rockford, IL 61107

Commodore Users Club
1707 East Main St.
Olney, IL 62450
Contact: David E. Lawless

Chicago Commodore 64 Users & Exchange Group
P.O. Box 14233
Chicago, IL 60614
Jim Robinson

Fox Valley PET Users Group
833 Willow St.
Lake in the Hills, IL 60102
(312) 658-7321
Art DeKneef

The Commodore 64 Users Group Inc.
P.O. Box 46464
Lincolnwood, IL 60466
(312) 583-4629
David Tam Kin

RAP 64/VIC Regional Assoc. of Programmers
10721 S. Lamont
Oak Lawn, IL 60453
Bob Hughes

The Kankakee Hackers
RR #1, Box 279
St. Anne, IL 60964
(815) 933-4407
Rich Westerman

WIPUG
Rt. 5, Box 75
Quincy, IL 62301
(217) 656-3671
Edward Mills

Papug-Peoria Area Pet Users Group
6 Apple Tree Lane
East Peoria, IL 61611
(309) 673-6635
Max Taylor

2nd Fri. of Month
McHenry County Commodore Club
227 E. Terra Cotta Ave.
Crystal Lake, IL 60014
(815) 455-3942
John Katkus

2nd Sat. at C. Lake Ambutal
Mt. Vernon Commodore Users Group (MVCUG)
P.O. Box 512
Mt. Vernon, IL 62864

Commodore 64 Users Club
104 Susan Lane
Carterville, IL 62918
(618) 985-4710
Doyle Horsley

Illinois Valley Commodore Users Group
2330—12th St.
Peru, IL 61354

(815) 223-5141
Brian Foster

Champaign-Urbana Commodore Users Group
2006 Crescent Dr.
Champaign, IL 61821
(217) 352-9681
Steve Gast

COMCOE (Commodore Club of Evanston)
2108 Sherman Ave.
Evanston, IL 60201
Jim Salsbury

Fox Valley 64 Users Group
P.O. Box 28
N. Aurora, IL 60542
(312) 898-2779
Frank Christensen

1st Thursday of month
Springfield PET Users Group (SPUG)
3116 Concord
Springfield, IL 62704
(217) 753-8500
Bill Eardley

3rd Fri. each month 7 p.m.
Fox Valley 64 Users Group
P.O. Box 28
No. Aurora, IL 60542
(312) 898-2779
Frank Christensen

1st Thurs. of month 7-10 p.m.
Commodore SIG Cache
Box C-176
323 S. Franklin, #804
Chicago, IL 60606
(312) 685-0994
Herb Swanson

3rd Sun. of month 11 a.m.
1 p.m.

INDIANA

PET/64 Users
10136 E. 96th St.
Indianapolis, IN 46256
(317) 842-6353
Jerry Brinson

Cardinal Sales
6225 Coffman Road
Indianapolis, IN 46268
(317) 298-9650
Contact: Carol Wheeler

CHUG (Commodore Hardware Users Group)
12104 Meadow Lane
Oakland, IN 46236
Contact: Ted Powell

VIC Indy Club
P.O. Box 11543
Indianapolis, IN 46201
(317) 357-6906
Fred Imhausen

Northern Indiana Commodore Enthusiasts
927 S. 26th St.
South Bend, IN 46615
Eric R. Bean

Commodore Users Group
1020 Michigan Ave.
Logansport, IN 46947
(219) 722-5205
Mark Bender

Computer Workshop VIC
20/64 Club
282 S. 600 W.
Hebron, IN 46341
(219) 988-4535
Mary O'Bringer

The National Science Clubs of America
Commodore Users Division
P.O. Box 10621
Merrillville, IN 46411
Brian Lepley or Jeff Brown

East Central Indiana VIC User Group
Rural Route #2
Portland, IN 47371
Stephen Erwin

National VIC 20 Program Exchange

102 Hickory Court
Portland, IN 47371
(219) 726-4202
Stephen Erwin

Commodore Computer Club
3814 Terra Trace
Evansville, IN 47711
(812) 477-0739
John Patrick, President

Commodore 64 Users Group
912 South Brown Ave.
Terre Haute, IN 47803
(812) 234-5099
Dennis Graham

Seymour Peckers
c/o D&L Camera Shop
108 N. Chestnut
Seymour, IN 47274
Dennis Peters

VIC/64 Users Group
c/o Delco Remy Div. General Motors
2401 Columbus Ave.
Anderson, IN 46014
(317) 378-3016
Richard Clifton

3rd Wed. or Thurs. of month
Commodore Owners Of Lafayette (COOL!)
20 Patrick Lane
West Lafayette, IN 47906
(317) 743-3410
Ross Indelicato

Fulton County Commodore Users
1705-3 Madison
Rochester, IN 46975
(219) 223-4430
Jim Tyler

2nd Thurs. of month

IOWA

Commodore User Group
114 8th St.
Ames, IA 50010

Quad City Commodore Club
P.O. Box 3994
Davenport, IA 52808
(319) 242-1496
Mike Hoeper

3rd Tues.
Siouxland Commodore Club
2700 Sheridan St.
Sioux City, IA 51104
(712) 258-7903
Gary Johnson

1st & 3rd Monday of month
421 W. 6th St.
Waterloo, IA 50702
(319) 232-1062
Frederick Volker

Commodore Computer Users Group of Iowa
Box 3140
Des Moines, IA 50316
(515) 263-0963 or 287-1378
Laura Miller

Commo-Hawk Commodore Users Group
P.O. Box 2724
Cedar Rapids, IA 52406
Vern Rotert

Newton Commodore Users Group
320 W. 9th St., S.
Newton, IA 50208
(515) 792-0814
David Schmidt

1st Wed.

KANSAS

Wichita Area PET Users Group
2231 Bullinger
Wichita, KS 67204
(316) 838-0518
Contact: Mel Zandler

Kansas Commodore Computer Club
101 S. Burch

Olathe, KS 66061
Contact: Paul B. Howard

Commodore Users Group
6050 S. 183 St. West
Viola, KS 67149
Walter Lounsbery

Walnut Valley Commodore User Group
1003 S. 2nd St.
Arkansas City, KS 67005
Bob Morris

Salt City Commodore Club
P.O. Box 2644
Hutchinson, KS 67501
Wendell Hinkson

KENTUCKY

VIC Connection
1010 S. Elm
Henderson, KY 42420
Jim Kemp

Louisville Users of Commodore KY. (LUCKY)
P.O. Box 22244
Louisville, KY 40222
(502) 425-2847
2nd Tues. of Month

The Bowling Green Commodore Users Group
Route 11, Creekside Apt. #6
Bowling Green, KY 42101
(502) 781-9098
Alex Fitzpatrick

C*BUG—Commodore Bardstown User Group
P.O. Box 165
Bardstown, KY 40004
(502) 348-6380
Patrick Kirtley

Glasgow Commodore Users Group
P.O. Box 154
Glasgow, KY 42141
Steve England

LOUISIANA

Franklin Parish Computer Club
#3 Fair Ave.
Winnisboro, LA 71295
James D. Mays, Sr.

NOVA
917 Gordon St.
New Orleans, LA 70117
(504) 948-7643
Kenneth McGruder, Sr.

VIC 20 Users Group
5064 Bowdon St.
Marrero, LA 70072
(504) 341-5305
Wayne D. Lowery, R.N.

64-Club News
5200 Corporate Blvd.
Baton Rouge, LA 70808
(504) 925-5870
Tom Parsons

3rd Tues. of month at CWA
Commodore Users Group of Oachita
P.O. Box 175
Swaric, LA 71281
(318) 343-8044
Beckie Walker

Ark-La-Tex Commodore 64 Club
5515 Fairfax
Shreveport, LA 71108
(318) 636-3611
Bill Walker

Every other Wed. 6:30 p.m.
Commodore 64 Users Group
P.O. Box 1422
Baton Rouge, LA 70821
Richard Hood

3rd Tues. of month

MAINE

COM-VICS (Commodore/VIC Users Group)
RFD #1, Box 2086
Hebron, ME 04238
(207) 966-3641

- Paul Lodge
1st Wed. & 3rd Thurs.
Your Commodore Users
Group
Box 611
Westbrook, ME 04092
(207) 854-4579
Mike Prociase
Northwoods Commodore
Users Group
740 Main St.
Van Buren, ME 04785
Diane Porter
So. ME. 64
10 Walker St.
Portland, ME 04102
(207) 761-1626
Ed Moore
Compumania
81 North St.
Saco, ME 04072
(207) 282-7418
Richard L. Nadeau
- MARYLAND**
Assoc. of Personal
Computer Users
5014 Rodman Road
Bethesda, MD 20016
Blue TUSK
700 East Joppa Road
Baltimore, MD 21204
Contact: Jim Hauff
House of Commodore
8835 Satyr Hill Road
Baltimore, MD 21234
Contact: Ernest J. Fischer
Long Lines Computer Club
323 N. Charles St., Rm. 201
Baltimore, MD 21201
Gene Molf
VIC & 64 Users Group
The Boyds Connection
21000 Clarksburg Rd.
Boys, MD 20841
(301) 428-3174
Tom DeReggi
Rockville VIC/64 Users Group
P.O. Box 8805
Rockville, MD 20856
(301) 231-7823
Tom Pounds
The Compucats' Commodore
Computer Club
680 W. Bel Air Ave.
Aberdeen, MD 21001
(301) 272-0472
Betty Jane Schueler
Westinghouse BWI
Commodore User Group
Attn: L. Barron
Mail Stop 5320
P.O. Box 1693
Baltimore, MD 21203
HUG (Hagerstown Users
Group)
23 Coventry Lane
Hagerstown, MD 21740
(301) 797-9728
Joseph Rutkowski
The Montgomery Ct.
Commodore Computer Soc.
P.O. Box 6444
Silver Springs, MD 20906
(301) 946-1564
Meryle Pounds
Commodore Users Group
of Annapolis
P.O. Box 9726
Arnold, MD 21012
(301) 974-4548
The Software Co.
Gaithersburg C-64 Users Group
12937 Pickering Dr.
Germantown, MD 20874
(301) 428-3328
Russel Jarosinski
3rd Thurs. G'burg Library
Jumpers 2064s
7837 B&A Blvd.
- Glen Burnie, MD 21061
(301) 768-1892
Walt Marhefka
Jumpers Mall, 1st Monday
Commodore 64 Users Group
11209 Tack House Court
Potomac, MD 20854
(301) 983-8199
Jorge Montalvan
VIClique (Linthicum Heights)
105A Conduit St.
Annapolis, MD 21401
(301) 263-8568
Pat Foley
M.I.T.A.G.S., 7pm Mon. varys
Southern MD Commodore
Users Group
6800 Killarney St.
Clinton, MD 20735
(301) 868-6536
Tom Helmke
1st Tues. of month 7:30pm
Edison Commodore
Users Group
4314 Oxford Dr.
Suitland, MD 20746
(301) 423-7155
Bill Foley
Naval Research Laboratory
Bay-Cug-Baltimore Area
Commodore Users
4605 Vogt Ave.
Baltimore, MD 21206
(301) 325-2156
Michael M. Broumberg
Harford County Commodore
Users Group
P.O. Box 209
Fallston, MD 21047
(301) 879-3583
Kim Loyd
1st Monday of month
- MASSACHUSETTS**
Eastern Massachusetts
VIC Users Group
c/o Frank Orday
7 Flagg Road
Marlboro, MA 02173
VIC Users Group
c/o Ilene Hoffman-Sholar
193 Garden St.
Needham, MA 02192
Commodore Users Club
Stoughton High School
Stoughton, MA 02072
Contact: Mike Lennon
Berkshire PET Lovers
CBM Users Group
Taconic High
Pittsfield, MA 01201
The Boston Computer
Society
Three Center Plaza
Boston, MA 02108
(617) 367-8080
Mary E. McCann
Masspet Commodore
Users Group
P.O. Box 283
Taunton, MA 02780
Harry Flaxman
Raytheon Commodore
Users Group
Raytheon Company
Hartwell Rd. GRA-6
Bedford, MA 01730
John Rudy
Commodore 64 Users
Group of The Berkshires
184 Highland Ave.
Pittsfield, MA 01201
Ed Rucinski
VIC Interface Club
48 Van Cliff Ave.
Brockton, MA 02401
Bernie Robichaud
Cape Cod 64 Users Group
358 Forrest Rd.
S. Yarmouth, MA 02664
1 (800) 225-7136
- Jim Close
(In MA. call) 1 (800) 352-7787
The Cursor Club
442 Mulpuf Rd.
Lunenburg, MA 01462
(617) 582-4056
John
Pioneer Valley VIC/64 Club
34 Bates St.
Westfield, MA 01085
(413) 562-1027
Marvin Yale
3rd Thurs. of month
EM 20/64 Users Group
36 Buckman St.
Woburn, MA 01801
John Chaplain
Commodore Users Group
c/o Best Business Equipment
269 Lincoln St.
Worcester, MA 01605
Berkshire Home for Little
PET Users
401 Pomeroy Ave.
Pittsfield, MA 01201
Tim Auxier
Pioneer Valley VIC Club
34 Bates Ave.
Westfield, MA 01085
(413) 562-1027
Marvin Yale
CUG of MA.
1132 N. Ridge Rd.
Westfield, MA 01085
(413) 568-2228
Paul & Jenny
- MICHIGAN**
David Liem
14361 Warwick Street
Detroit, MI 48223
VIC Users Club
University of Michigan
School of Public Health
Ann Arbor, MI 48109
Contact: John Gannon
Commodore User Club
32303 Columbus Drive
Warren, MI 48093
Contact: Robert Steinbrecher
Commodore Users Group
c/o Family Computer
3947 W. 12 Mile Rd.
Berkley, MI 48072
VIC for Business
6027 Orchard Ct.
Lansing, MI 48910
Mike Marotta
South Computer Club
South Jr. High School
45201 Owen
Belleville, MI 48111
Ronald Ruppert
Commodore Users Group
c/o Eaton Rapids Medical Clinic
101 Spicerville Hwy.
Eaton Rapids, MI 48827
Albert Meinke III, M.D.
South East Michigan Pet
Users Group
Box 214
Farmington, MI 48024
Norm Eisenberg
Commodore Computer Club
4106 Eastman Rd.
Midland, MI 48640
(517) 835-5130
John Walley
9:30 p.m. Sept/May
VIC, 64, PET Users Group
8439 Arlis Rd.
Union Lake, MI 48085
363-8539
Bert Searing
COMP
486 Michigan Ave.
Marysville, MI 48040
(313) 364-6804
M. Gauthier
- Ann Arbor Commodore
Users Group
Ann Arbor, MI 48103
(313) 994-4751
Art Shaw
3rd Tues. 7:30-10:00
DAB Computer Club
P.O. Box 542
Watervliet, MI 49098
(616) 463-5457
Dennis Burlingham
West Michigan Commodores
c/o R. Taber
1952 Cleveland Ave., S.W.
Wyoming, MI 49509
(616) 458-9724
Gene Traas
Debug
P.O. Box 196
Berrien Springs, MI 49103
(616) 471-1882
Herbert Edward
Last Thursday of Month
Jackson Commodore
Computer Club
201 S. Grinnell St.
Jackson, MI 49203
Alfred Bruey
Last Thur. of Month 7:30 p.m.
SMCUG
1002 Pfau St.
Mankato, MI 56001
(507) 625-6942
Dean Otto
SEM 64
25015 Five Mile #3
Redford, MI 48239
(313) 537-4163
Gary Groeller
C.A.T.O.
17606 Valade
Riverview, MI 48192
Dean Tidwell
Mid-Michigan
Commodore Club
Clare, MI
(517) 386-3429
Virgil Graham
3rd Mon. 7pm Clare H.S.
Michigan's Commodore 64
Users Group (MCUG)
P.O. Box 539
E. Detroit, MI 48021
(313) 773-6302
William G. Osipoff
Michigan's Commodore 64
Users Group
P.O. Box 539
East Detroit, MI 48021
20050 Winchester
Southfield, MI 48076
(313) 354-7224
Steve Lepsetz 353-1130
Slipped Disk, Inc.
31044 John R
Madison Heights, MI 48071
(313) 583-9803
- MINNESOTA**
MUPET (Minnesota Users
of PET)
P.O. Box 179
Annandale, MN 55302
c/o Jon T. Minerich
Twin Cities Commodore
Computer Club
6623 Ives Lane
Maple Grove, MN 55369
(612) 424-2425
Contact: Rolliie Schmidt
Brainerd Area Commodore
Users Group
1219 S.E. 11th St.
Brainerd, MN 56401
(218) 829-0805
Norm Saavedra
1st Thurs. 6 p.m. &
3rd Sat. 10 a.m.
Lake Superior Commodore
1936 Lawn St.
Duluth, MN 55812
- (218) 728-3224
Peter Roufs
Heartland Area Computer
Cooperative
Route 4, Box 204
Little Falls, MN 56345
(612) 632-5511
Robert Walz
- MISSISSIPPI**
Commodore Biloxi
User Group (ComBUG)
Universal Computer Services
3002 Hwy. 90 East
Ocean Springs, MS 39564
(601) 875-1173
John Lassen
Commodore Computer Club
Southern Station Box 10076
Hattiesburg, MS 38401
(601) 268-7585
Andrew Holder
Commodore Biloxi
Users Group
c/o Universal Computer
Services
3002 Hwy. 90 East
Ocean Springs, MS 39564
(601) 875-1173
John Lassen
- MISSOURI**
KCPUG
(Commodore User Group of
Kansas City)
P.O. Box 36492
Kansas City, MO 64111
(816) 252-7628
Salvadore
Commodore User Group
of St. Louis
Box 6653
St. Louis, MO 63125-0653
Dan Weidman, New Members
1541 Swallowtail Dr.
St. Louis, MO
VIC INFONET
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is where we fix it.*

Issue 30 (July/August)

Editor's Notes

On page 12 our illustrious editor wrote, "If you get yourself a modem... you can hook up your computer to your touchtone telephone." First, change "modem" to read "Commodore modem". Then change "touchtone" to read "modular".

Issue 30 (July/August)

Home University

The following printing errors should be corrected as follows:

(1) Equation (16) should read $\tan \theta = \dots$, instead of $\tan^{-1} \theta = \dots$

(2) In the first block of the flow chart the subscripts 0,1,2 are missing under the a's.

Issue 30

PEEK Magazine advertisement

We have received numerous complaints from readers who sent money to PEEK Magazine but have not, as yet, received either a product, a refund or a response. Please let us know if you have had a similar problem.

Issue 30

"A New World Opens Up"

Our records for the Canadian telecommunications bulletin boards (page 37) were evidently pretty moldy. Canadian BBS enthusiast Richard Bradley called us with the following corrections:

Steve Punter's bulletin board in Mississauga is open from 6 p.m. to 9 a.m. weekdays.

NORTEC's sysop is now Steve Mane, the new access number is 416-487-2593 and the hours of operation are a straight 24 hours.

The TPUG BBS, located at 1912A Avenue Road, Toronto, Ontario M5M 4A1, also has a new sysop, Tom Shevlin. The new access number is 416-429-6044, and the bulletin board is open 24 hours to active members of TPUG.

New bulletin boards, according to Richard, include:

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% Richard and David Bradley
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messages: 416-487-5833
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C

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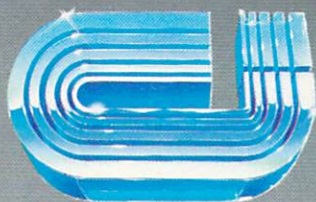
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